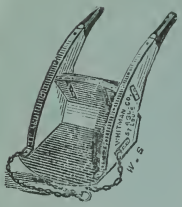
REPORT OF THE PROCEEDINGS OF THE

MISSISSIPPI VALLEY DAIRY AND CREAMERY ASSOCIATION,

HELD IN ST. LOUIS, MO.

JANUARY 30 AND 31,



ROAD SCRAPER.

Warranted steel, polished bottom, furnished with chain bale.

WHITMAN AGRICULTURAL CO.

—GENERAL MANUFACTURERS OF—

First-Class Machinery

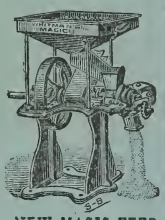
Send for Circulars and Special Prices for Machine Wanted.

Office and Factory, 8th St. and Clark Ave.

ST. LOUIS, MO.

HORSE POWER.

We manufacture two sizes as above, with or without increased speed. Also 4, 6, 8 and 10 horse.



NEW MAGIC FEED MILL.

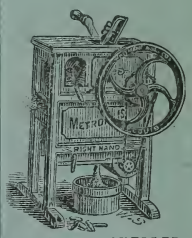
With iron frame and cast cast-steel grinders. Best and cheapest mill made. Every man his own miller.

WHITMAN'S IMPROVED

SEELEY PATENT

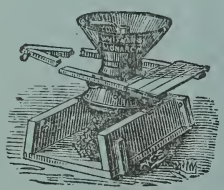
PERPETUAL HAY AND STRAW PRESS.

Received first premium at N. Y. State Fair, 1880, '81 and '82, and grand gold medal in '83. over Dederick and others. The only perfect hay press made. Puts 10 tons in car. Most simple and durable. A bale every 3 minutes. Satisfaction guaranteed. Three bales to any other press' two. Send for circulars.



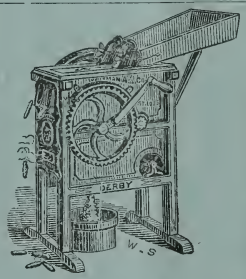
METROPOLIS SHELLER.

A single hole sheller, is strong and serviceable. Furnished with fan if desired.



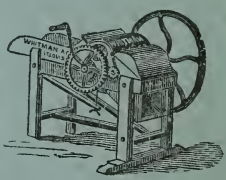
MONARCH CORN AND COB MILL.

Only mills made with cast cast-steel grinder. Warranted superior to any in use, for all purposes. Will grind faster, run easier and wear longer. *Satisfaction guaranteed.*



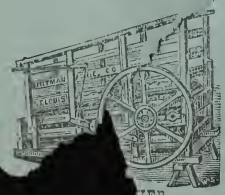
DERBY SHELLER.

The lightest running double hole corn sheller in market This sheller has pulley for belt, also crank, and is furnished with fan and feed table.



ST. LOUIS FEED AND ENSILAGE CUTTER.

This cutter is made in six sizes. Length of cut changable. Spiral knife and shear cut. All sizes furnished with safety balance wheel.



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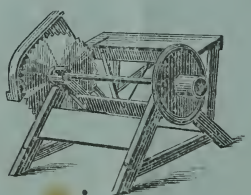
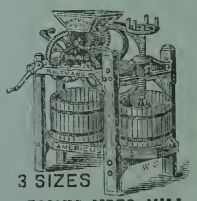


SAW TABLE.

We make both swing and slide table. Is easily driven by one or two horse power.



3 SIZES

AMERICUS CIDER MILL.

The best cider and wine mill made.

COMPLIMENTS OF

JOS. W. SHEPPARD,

SECRETARY,

—AND—

BUSINESS MANAGER "COLMAN'S RURAL WORLD."

OFFICERS OF THE MISSISSIPPI VALLEY DAIRY AND CREAMERY ASSOCIATION.

MISSISSIPPI VALLEY

DAIRY AND CREAMERY

ASSOCIATION.

FIRST ANNUAL MEETING,

—HELD IN THE—

HALL OF THE POLYTECHNIC BUILDING,

ST. LOUIS, MO.

WEDNESDAY, THURSDAY, JANUARY 30 AND 31, 1884.

OFFICERS:

NORMAN J. COLMAN, St. Louis,	-	*President.*
JOS. W. DRURY, Waterloo, Ills.,	-	*First Vice-President.*
JOS. E. MILLER, Belleville, Ills.,	-	*Second Vice-President.*
JOS. W. SHEPPARD, St. Louis,	-	*Secretary.*
W. N. TIVY, St. Louis,-	- -	*Treasurer.*

ST. LOUIS, MO.:
BARKER & ROHLFING, Prs., 120 N. Third Street,
1884.

INTRODUCTION.

ON Saturday, October 6, 1883, a number of gentlemen, interested in Dairy and Creamery interests, assembled in the office of the *Rural World* on the St. Louis Fair Grounds, to discuss the subject of an organization pertaining to these interests. At that meeting the Mississippi Valley Dairy and Creamery Association was organized, the officers elected, and a constitution adopted. It was also decided that the first annual meeting of the Association should be held in St. Louis, on the 30th and 31st of January, 1884, of which the following pages bear evidence.

Whatever were the sanguine expectation of the writer, as to the success likely to attend the first meeting, they were far below what reality gave cause for congratulation over, as the meetings were attended, not only by an unexpectedly large number of delegates and their friends, but the earnestness that pervaded the whole proceedings, show that the Association had been formed in a most opportune time to be the acceptable medium through which knowledge could be diffused to the great advantage of those attending.

It was demonstrated at these meetings that the Creameries situated in the more northern latitudes do cease to make butter when the highest prices are being paid for their product. They being forced to close down by reason of the severity of the winter season.

It was also shown that Creameries situated in these more southern latitudes can, and do make butter all the winter, in fact all the year round, which forces the conclusion that butter making in this southern climate is a more profitable business than in Northern Iowa, Illinois or Wisconsin, where, up to the present time, the best grades of butter are made and the highest prices realized as a whole.

This one fact borne in mind covers a multitude of arguments, and no doubt will be found to be the greatest inducement to the farmers situated in this parallel, to first investigate, and then establish Creameries in this climate where neither the extremes of heat or cold last long enough to cripple or even temporarily suspend the working of the enterprise.

The writer also desires to call the attention of all those interested in the making of Butter and Cheese in this latitude to the fact, that the Mississippi Valley Dairy and Creamery Association propose, if possible, to form a Butter and Cheese Board of Trade in St. Louis, after the fashion of the Board in Elgin, Illinois, whereby the product of the factories now built, or being built, in this and adjoining territory, will find an easy and satisfactory outlet.

This subject will be investigated by the writer during the coming summer and fall, who hopes that by the time of the next meeting of the Association, in January, 1885, to be able to present for your consideration a feasible programme for you to act upon.

The idea is here presented as a subject for the mature consideration of all concerned, and the time between now and the next meeting allows of the subject being well digested by the reader as it will be by,

Yours respectfully,

JOS. W. SHEPPARD,
SECRETARY.

Address: 600 OLIVE STREET, ST. LOUIS, MO.
All inquiries will receive prompt attention.

Report of the Proceedings of the Meeting

—OF THE—

MISSISSIPPI VALLEY DAIRY AND CREAMERY ASS'N,

—HELD IN THE—

Hall of the POLYTECHNIC BUILDING,

ST. LOUIS, MO.

Wednesday and Thursday, January 30 and 31, 1884.

The meeting was called to order at 11 A. M., by the President, Norman J. Colman, and the proceedings opened by the Secretary, J. W. Sheppard, reading the following Constitution, which had been adopted at a former meeting held in the office of the *Rural World*, at the St. Louis Fair Grounds, on the 6th day of October, 1883, when this Association was formed.

Constitution.

Article 1. The name of this Association shall be the Mississippi Valley Dairy and Creamery Association.

Art. 2. Its objects shall be to give aid and encouragement to the Dairy and Creamery interest of the Mississippi Valley, by holding meetings for the discussion of all questions pertaining to these interests and for the exhibition of the products of the dairy and of such apparatus as may be used in such establishments.

Art. 3. The officers of this Association shall consist of a President, two Vice-Presidents, a Secretary and Treasurer, who shall be elected and serve for one year and until their successors are duly elected and qualified.

Art. 4. The annual meetings of the Association shall be held in January of each year, at such time and place as the Association may designate, or it may confer the designation of time and place upon the officers of the society. The duties of the officers shall be such as usually appertain to such officers.

ART. 5. The officers elected at this meeting shall hold their offices only until the annual meeting in January next.

ART. 6. Any person interested in or in sympathy with the objects of this organization may become a member by payment of one dollar.

ART. 7. This Constitution may be amended at any regular meeting by a vote of two-thirds of the members present.

The President then requested the delegates to hand in their names and credentials to the Secretary. The following is a full list of the members:

DELEGATES.

Missouri.

Norman J. Colman, St. Louis.
J. W. Sheppard, St. Louis.
W. N. Tivy, St. Louis.
B. S. Edmonds, Pattonville.
J. F. Ewing, St. Louis.
E. T. Hollister, St. Louis.
D. B. Kellogg, Keytesville.
J. S. Evans, Caledonia.
W. T. Humphrey, Lewiston.
J. A. Peirsol, Monroe City.
Hon. J. H. Morse, Morse's Mills.
Daniel Douglass, Pevely.
H. W. Douglass, Pevely.
T. C. Campbell, Manchester.
Dr. H. B. Butts, Louisiana.
G. E. Wetzel, St. Louis.
J. B. Thompson, La Plata.
Nathan Williams, Kidder.
Charles Cabanne, St. Louis.
Festus J. Wade, St. Louis.
C. A. Adams, Chillicothe.
T. J. Powell, New Florence.
John Purcell, St. Louis.
Prof. J. W. Sanborn, Columbia.
Bowman & Co., St. Louis.
Geo. P. Strong, St. Louis.
W. N. Morrison, St. Louis.
Thos. P. Miller, St. Louis.
Edwin H. Jeffries, St. Clair.
Hudson Bros., St. Louis.
Hoffman Bros., St. Louis.
Hartmann & Co. St. Louis,
J. M. Powell, La Plata.
J. A. Sturges, Bushberg.

Illinois.

Jos. W. Drury, Waterloo.
Jos. E. Miller, Belleville.
H. H. Palmer, Rockford.
J. M. Brent, Chicago.
F. V. Perry, Rockford.
C. P. Willard & Co., Chicago.
S. T. Hopson, Girard.
J. C. Ritchie, Marissa.
J. J. Whitmore, Godfrey.
J. Y. Sawyer, Jr., Godfrey.
J. M. Scott, Belleville.
Davis & Rankin, Chicago.
A. H. Wing, Vandalia.
J. A. Vance, Troy.
G. W. Hilliard, Brighton.
J. P. Vissering, Wellville.
D. W. Bryant, Waterloo.
W. W. Barmsback, Troy.
Jacob Eisenmayer, Mascoutah.
H. C. Santeeman, Edwardsville.
James Morrow, Sparta.
S. W. McKelvey, Sparta.
C. W. Sibley, Pana.
M. R. Trumbower, Sterling.
Frank K. Gillespie, Edwardsville.
J. W. Stout, Chicago.
J. C. Perkins, Sparta.
D. J. Kirkman, Winchester.
Robert Bryce, Butler.
L. D. Smith & Bros., Shipman.

Kansas.

James Hirst, Barclay. R. C. Brant, Hiawatha.
Isaac S. Hampton, Barclay.

New York.

George Addy, New York City. Col. T. D. Curtis, Syracuse.

Ohio.

I. N. Poe, Toledo. J. W. Stillwell & Co., Troy.

Wisconsin.

D. W. Curtis, Fort Atkinson. Hon. H. Smith, Sheboygan Falls.
I. H. Wanzer, Darlington.

Iowa.

Gov. H. G. Gue, Des Moines.

The Chair appointed the following committee on arrangement and programme: Messrs. Miller, Wirst, Morse, Hobson, Prof. Sanborn and Hon. Hiram Smith.

Mr. Jas. S. Evans, of Caledonia, Washington Co., Mo., was the first to address the meeting after it was called to order by President Colman. He called the attention of the members of the Association to an inviting field for a practical Dairyman and Cheesemaker. They had all the facilities, a well equipped Creamery, a tract of land 7 by 14 miles, a natural blue grass region, watered by many never failing springs, an abundance of Cream and Milk in the vicinity that was regularly brought to the Creamery. The company of which he was a member, failed for want of the practical knowledge necessary to couduct such an establishment. Related among other mistakes, the first batch of cheese turned out found them without any boxes; had to send to Ohio for them, and when they were finally received the cheese was spoiled. The expensive luxury they had imported from Ohio to conduct the business, proved too much of a failure to be retained, and now they are ready to offer the most inviting position to the right party, etc. The beautiful tract of land could not, he said, be duplicated in the State; and to this might be added the interesting information that right there, too, there was 100 of the finest young women that ever walked on God's green earth, and they all wanted to marry.

The President said he had attended the National Butter and Egg Association's meeting at Cincinnati last year, and, judging from the representation present at this meeting, it promised to be a much more important one and liable to achieve more practical results. The meeting then took a recess until 2 o'clock in the afternoon.

AFTERNOON SESSION, JANUARY 30.

On re-assembling an address of welcome was made by Mr. C. W. Barstow, First Vice-President of the Merchants' Exchange, St. Louis, in the absence of the President, who was to have made it, but was prevented by prior engagements. Mr. Barstow was short in his remarks, but earnestly and heartily welcomed the members of the Association to the city and to the freedom of the Merchants' Exchange whilst here. Though engaged in an entirely different department of business, he fully appreciated in this, as in all others, the necessity of co-operation and united effort, and hoped that the work here and now so well begun, would have its full fruition in the larger development of this most profitable industry, that the Mississippi Valley Dairy and Creamery Association would, in years to come, be found one of the most important of its kind in the country and justify the hopes of its founders.

Norman J. Colman responded, thanking Mr. Barstow for the cordial manner in which he had welcomed its members and expressing the earnest hope that the future of the Association would fully justify the high expectations he had formed of both its success and usefulness.

Prof. J. W. Sanborn, Dean of the College of Agriculture, Columbia, Mo., then gave an address as follows on the

IMPORTANCE OF THE DAIRY AND CREAMERY INTERESTS TO MISSOURI.

The United States and Missouri produced the following amounts of butter in past decades:

Per Capita.	*The U. S.*	*Missouri.*
1850	14.7	11.4
1860	14.5	10.7
1870	13.3	8.3
1880	15.3	13.1

In 1880, Iowa produced 34.1 lbs., and Vermont 78.9 lbs., per capita. In 1880 the United States exported, .78 lbs., per capita. Using these figures we find that Missonri produces 10.6 per cent. less butter than the country averages to consume, notwithstanding, the southern belt of States consume but little butter. We find, on inquiring, in St. Louis that we consume very much more than we produce. Poverty does not, then, cut down our consumption much below our neighboring States; but short-sightedness induces us to sell corn at 1-2 a cent a pound, and to buy butter to-day at 40 cents

a pound, or about 4 cents a pound for the corn we sold is again paid for it, or nearly eight fold increase. We sell brawn in our raw product, at unprofitable prices and buy brains, or skill, back again in fine butter. This is not only a loss but a shame to us, as our climate, pasturage and location, has fitted us for a great butter producing State.

Corn and wheat sells soil fertility. The components of butter are entirely drawn from the air and water, the common property of all the States. The latter does not exhaust the soil, the former has carried our wheat and corn averages steadily down for a long series of years, until during the past five years, we have reached the lowest average of any previous five years, and so low as to make their production unprofitable. Wheat stands at an average of 11 and a fraction, and corn 26 and a fraction bushels per acre. 26 bushels of corn per acre means for the average corn grower $6.50 gross revenue per acre. Surely some change is demanded. I am told that the dairy and its petty attentions will do for the small farmers of the East. Are we great farmers, and so successful that we can afford to neglect the most profitable department of farming? In 1870 our farms averaged 149 acres, in 1880 they averaged 126 acres. Surely there is a mistake about our being great farmers, and also a mistake about the dairy being too small a matter for our attention. We probably consume 36,000,000 lbs., worth $9,000,000. Again, the dairy is necessary to the cheap steer, or for cheap beef. We now use more of our cows for the calf alone, never milking her. The calf costs when weaned, $26—wintering, 2 tons hay at $5 pasturing $9, interest and risk $2; as she takes the place of a steer and a half, she shuts out the profit on these, we will use $5 as a low sum, total of $26, (the above figures were given the speaker by the andience, by request). This serious cost, giving rise to a general complaint that beef does not pay as well as it did before the ranche extension, is needless. Our calves at the College farm are raised with skim milk and the cow yields a direct profit for butter. Mixed farming, with the dairy, are indispensible requirements in our presene stage of agriculture.

OBSTACLES TO OVERCOME.

We have cows bred for beef, nursed a few months and then driven off. A radical reformation in breeding, selection, handling and care of our cows will have to be made or disaster will surely befall many of our creameries, the fault not resting in creameries, but in the low character of our dairy practices, which are undoubtedly at a low ebb. 1st. We want cows selected for butter excellence that will milk ten months of the year and give no less than 200 lbs. butter per cow. 2nd. The cows must have home shelter and bedding for cleanliness. 3rd. Dog-ing and racing with horses our cows, so very common with us, must be supplanted with the greatest gentleness in handling. 3rd. We must have pure water, less weeds in our pasture, and in many sections less shade for good butter. 4th.

We need to train a line of milkers, easy enough, but yet needed in this State. 5th. We must make a better quality of butter. Our butter has an unenviable reputation; we can sell none beyond our borders until we make it better.

Good, pure, or uninjured food, is absolutely essential; corn meal and good hay give butter a good flavor and texture, and a good quantity. With the skill that may be readily acquired, this State is favored with the conditions that ought to make her the great butter producing State of the West. The development of our dairying will greatly increase the fertility of soils under proper management and the wealth of the community where carried on. Missouri should sell only the products of her crops, but not her crops.

Mr. C. W. Murtfeldt, formerly Secretary of the State Board of Agriculture, then read an essay on Associate Dairying:

Mr. President and gentlemen, allow me to assert, that the conditions of a successful creamery differ in no essential or perceptible degree, from those of a successful individual dairy; except that, supposably, a greater amount of milk, cream and butter are to be handled. I mean by this statement, that the manipulation of milk, cream and butter, in their various stages from the udder of the cow, to market, are precisely the same; hence, in giving you the salient points of a paying dairy, supported by my own experience of many years, and of many more years of study and observation, you will have the data upon which the creamery may be made to pay. I can offer no opinion as to whether it be more profitable to receive milk at the creamery, or to gather cream by measure or weight. Doubtless there are those here present who have practical experience on these points, and will give it to you, backed up by figures, which some men say cannot and do not lie.

Now, being somewhat prepared to take a practical view of the matter under consideration, you ask: do creameries pay? or perhaps you ask, can they be made to pay in this section of our land? I answer, why not? Establish or produce the necessary conditions and they will pay. Anticipating the next question: What are the necessary conditions? I proceed to give you my views, and shall endeavor to explode certain theoretical axioms, (practically exploded long ago) if in my power: First, that there are certain climatic conditions which must obtain naturally, and therefore cannot be controlled by man. I admit that there is a "cotton belt," and also a "sugar belt," and that it is folly to try to raise cotton or sugar (if from Southern cane), north of its Northern limit. But when it is asserted—which at one time was the case—that the Western Reserve of Ohio is both the Western and the Southern limit of the imaginary dairy belt, I most emphatically protest and deny the proposition.

I had the honor, if any attaches, of being one of the pioneer dairymen of Northern Illinois, said at that time to be out of the

"dairy belt," because too far West, and minus tame or cultivated grasses. For eleven years I marketed my butter, and that made after our method by some of our neighbors, in St. Louis, and often obtained from 25 to 28 cents per pound, when ordinary dairy butter retailed for from 10 to 12 cents, and I could now give you the names of a score of old residents of St. Louis, my former patrons, who would at once be recognized as gentlemen and ladies of the very elite of St. Louis at that time. Out of that proven fact, namely, to produce the best kind of butter in that section, have grown the vast dairies in Northern Illinois, Wisconsin and Iowa, the former now represented by the Dairymen's Exchange of Elgin, Illinois.

Illinois has now 409 creameries in active operation, Iowa has over 600, and Wisconsin has nearly as many, and a number of private or individual dairies besides; and New York and Boston and other eastern cities furnish their consumers of their dairy product, not even to mention the exportation of the same.

But to return to my proposition: Unlike the sugar and the cotton belt, the conditions of successful dairying are almost entirely under the control of man, because the temperature required for milk, cream and butter, and the apartments in which to manufacture or store can be artificially produced. Ice in summer, and wood and coal in winter, with the best adapted aparatus and careful observation, will, or rather can be made to furnish a temperature most favorable to produce the best results, even here in this section, though most likely at a little extra cost.

Let me give you the record made by some noted Jersey cows: The Jersey cow, Nancy Lee, owned by C. Easthope, Niles, Ohio, and taking sweepstakes as best Jersey cow, has the following record: Gave 1,430 pounds, three ounces of milk in thirty-one days. There was made from this milk 95 pounds, three and one-half ounces of butter. In one day her milk made four pounds, two and one-half ounces of butter; in seven days 26 pounds, eight and one-half ounces. Coomassie's milk, 16 5-8 quarts, made 2 pounds 7 ounces butter. Maudine, of Elmwood, gave 227 pounds, 14 ounces of milk from the 19th to the 26th of February, which produced 16 pounds, 15 ounces of butter. There are at present in the United States 600 Jersey cows, which have records of over 12 pounds of butter per week. This naturally leads to the second item, viz: The right kind of pastures and feed. I find that with proper cultivation all perennial grasses, justly so highly valued in the "butter belt" of old, flourish in this vicinity, and in addition we have that so justly rated highest—I mean the blue grass. Timothy, orchard grass, red top or foul meadow and clover. For hay, Hungarian and Millett, when sown thick so as to produce fine blades, are very valuable for winter feeding, also a blue grass pasture, which has lain idle since the previous June, is of great value. But as good lands are very valuable and high priced in these parts, and as it requires two acres to pasture one cow through the season, if she is

allowed to roam at will, in a dry summer even that would not be sufficient, the aim and practice should be to soil the cows; that is, to cut the feed green, allow it to wilt, so as to evaporate a large portion of the water it contains, which would make the handling thereof lighter and lessen the labor of hauling and feeding, and concentrate the nutritive parts and feed in a small lot or even stalls. In order to keep in good health, cattle must exercise some, and if this can be done while they are driven to water, all well; if not, some other way must be provided. Rye may be sown in early autumn for late pasture and also to be cut before the grasses next spring; yet, so as not to make it all the rough feed given, because it is claimed by some authorities that it will cause abortion.

For winter feeding, roots should also form a large part. Carrots, mangolds, ruta-bagas, Russia turnips and potatoes, are named in this connection. Bran, shipstuff, corn meal and linseed meal, the latter in small quantities would go to make up a change of feed, and all of those are greatly relished by the stock, and are conductive to good health and an increase in the production of milk.

My No. 3 refers to pure water for the drink of the cattle, and also necessary in the manipulations of the utensils, and in the manufacture of butter. Clear streams, whose waters are not impregnated with deleterious minerals, are good enough for watering stock. But there is no water equal to pure filtered rain water, for the washing of butter. This can be obtained from the building or buildings of the creamery or dairy, if a little attention is given to allow the first rain-fall to wash off the roofs, and after that run into the filters and thence into the cistern. Such water is as pure (if not absolutely so) as is desirable; it is colorless and tasteless.

But I proceed to No 4. The right temperature for milk and cream. And here at the outset I will state that milk and cream need pure air; not in a draught, which tends to make the cream leathery; but an even temperature of from 60 to 65 degrees; cream should be churned at 62 degrees. No cream should be added to the mess for at least three hours before churning, when the cream should be well stirred and left to ripen. Buildings can be so constructed, or apartments in buildings at least, which will hold a uniform temperature at these points, even in very warm weather. The air within and without in surroundings should be pure and sweet; hence the yards, sheds and stables should be kept scrupulously clean.

Common earth and also lime are great deodorizes, and should be freely used with the solid excrements of the stock, while it would well pay, in an economic point, to conduct the liquids of the stable to a tank, which would be provided with a tight covering. There is nothing in dairy economy so quick to spoil from bad odors as milk. And while at least one head of a German experimental station denies the influence of feed upon the taste of milk, so as to taint the same, we, on this side of the ocean, know better. A little incident,

personal to myself, will explain this point: In the spring of 1845, I was engaged in a work, which obliged me to set at other people's tables. This was in northern Illinois, and in the proximity of two groves. At breakfast I found beside my plate one-half of an onion, and was counseled to partake of the same, for the reason that I would not taste a peculiar flavor in the cream and with my coffee, which would most likely produce nausea unless I did so. On inquiry for the reason of that peculiar flavor, I was informed that the milch cows roamed in the groves and fed upon wild onions to some extent, these having started to grow earlier and quicker than the grass. Cabbage and turnips, when fed plentiful will produce a like effect. though to a less degree. Therefore all these vegetables and any thing like garbage or decayed fruit must be far removed from the milk house, and when in a decaying condition should immediately be covered with earth, or hauled to the field. If you will allow me to take a step back, I will state that is best to expel the animal heat from the milk as soon as possible, after it is drawn from the udder; ice, if pure, may be used in summer, and heat in winter. I would not advise the use of ice from pools of standing water, even for the purpose of cooling the apartment or dairy room, and *most certainly not* to be applied to the milk directly.

I have hitherto said not a word of coloring butter. I believe that where roots are fed and linseed meal, it is not necessary. It is a depraved taste or public opinion which demands it, and it is more or less deleterious to the keeping quality of butter. Anotta, a red coloring matter is generally used; but the color is not natural, as can be easily proven by placing such butter alongside of that which has not been artificially colored. I am of the opinion that the juice of sweet carrots would produce the same result.

The next point is perfect cleanliness of the milkers and also of the utensils; this will be conceded without argument. Allow me to emphasize this point. "There must not be any odors, decaying vegetables, or garbage, or taint of manure, anywhere near where the milk is set, and not even in the yards or sheds where the milk is drawn.

The milkers hands should be clean, and if possible, soft; the finger nails be pared short, and, if farm laborers must do the milking, the hands should be washed in warm water and made pliable by friction, previous to milking. The same person should milk the same cows as nearly always as possible. There should be no noise or coversation while the milking is being done, and this should be done as rapidly as possible, and to the last spoonful. The utmost gentleness should be exercised towards the cows even under the severest provocation. A good and profitable cow is easily spoiled and made worthless for the dairy by a careless and passionate milker. A good cow is in one sense a machine originally perfect, which will run like a clock or watch, and is as easily spoiled as either. She is also a machine in another sense; she will convert

the feed and drink given her into milk and its product, (by the aid of man of course.) The dairyman must learn by observation or rather, *he should know* how much feed an individual cow will consume and assimilate, or use and digest, and yet keep her health and appetite good, so as to relish all the feed given, and thus produce the most of milk and butter. Overfeed a milk cow once and it will take her a week or two to regain her appetite, and during all this time she will shrink in flesh and in her milk, and this, of course ends in loss of cash.

And now lastly as to expert butter makers, allow me to say that they are none too plentiful. There are points in the process which can only be ascertained by experience; though the art can be so easily described in words, that any one at all familiar with the implements and technical terms of dairying could soon understand. Experience, however, is the best schoolmaster, and bought wit is good, if not bought too dear. *Allow me my hearers just to hint that you cannot afford to purchase in that market!*

MARKETS.

The large cities of Missouri, Kansas, Colorado and the south will afford good markets for all. A No. 1 gilt-edged butter this section can produce.

In summing up this essay and the proposition submitted for your consideration, I wish to be understood as reiterating the axiom that if you can produce certain conditions, which I have endeavored to point out, successful creameries can be established in this latitude; though outside of and south of the so-called "dairy belt." By inference I have pointed out certain other conditions, which, unless these are met, your enterprise will most likely result in failure. In other words: Produce the live-stock, the best feed, the right sort of men and women operatives, the temperature and utensils, and the business man to conduct the enterprise, and make sales at the most oportune time and place, and success is assured. Without any of these, failure is certain.

I learn from most reliable sources that last year the butter of some of the Iowa creameries was bought at 22 or 23 cents per pound and held for higher prices until late autumn or winter. The buyer lost thousands of dollars, and the last of his purchase sold in New York for eleven cents per pound. This shows that sagacity and business tact are great points in a manager. Just now, and for weeks past, the best creamery butter has been selling by the tub at 40 cents and over.

I stated in the outset the enormous increase in cash value of the dairy products of the United States. It is greater than the value of all the cotton and wool combined; greater even than the value of all the wheat of the land. Hence, men have tried to imitate butter, and are manufacturing oleomargarine, butterine, and lardine, and other concoctions of fat, oil and grease, thus undermining the sale of the genuine article. Therefore, in closing, I take pleasure to say

for our much maligned State of Missouri, her legislature and her courts, that we have a law sustained by decision of our higher courts declaring the manufacture and sale of these abominable and deleterious substitutes a fraud.

I give you a brief synopsis of this law as I find it in print, and I will add the further fact, that even the Supreme Court of the United States has, by its Chief Justice and District Court declared it a good law and will sustain it, should an appeal carry it before that tribunal:

Whoever manufactures out of any oleaginous substances, or any compound of the same other than that produced from unadulterated milk or cream from the same, any article designed to take the place of butter or cheese produced from pure unadulterated milk or cream of the same, or shall sell or offer for sale the same as an article of food, shall, on conviction thereof, be confined in the County Jail not exceeding one year, or fined not exceeding $1,000, or both.

The President introduced Mrs. A. H. Wing, of Vandalia, Ills., who read the following interesting paper on the management of the dairy:

Management of the Dairy.

There appears just now a growing interest among the farmers in regard to the dairy and creamery business. Almost every farmer you meet has something to say upon the subject. The question is: "Which will put the most money into the farmers' pocket, to go into the dairy business themselves more thoroughly, or sell their cream to a creamery?" I am very frequently asked the question: "Does it pay to keep so many cows?" I answer yes. But to make it pay you must keep good cows, and no other, for one or two inferior cows will eat up all the profits of the good ones. Then they must be well fed on the best and most nutritious food. I think the very best feed a milk cow can have is clover hay, all she can eat, and a good feed twice a day of corn and oats, ground together, and all the water she will drink, (not ice water either), pure, fresh water from the well. Then they should be provided with clean, warm, comfortable barns, where they will be safe from the inclemency of the weather. In a word, keep all the good cows you can, and keep them well; give them more of your individual attention; don't throw too much responsibility on hired help. Make it your business to look after your cows, keeping yourself posted on all and everything connected with them, Be sure your cows are milked by careful, kind and gentle hands, and the milking done in the most cleanly and quiet manner.

Use tin pails; never use wooden ones; you cannot keep them sweet and pure, and never allow your milk pails to be used for any other purpose. Set the milk in deep cans, not too large to be conveniently handled, twenty inches deep by eight in diameter, with close-fitting covers, I think the most desirable, the cans to be set in

a tank of cold water or refrigerator, where the milk will be kept at a uniform temperature of fifty-four degrees. Of course, if you have a spring of clear cold water where you can convey the water around the milk you can keep it better than any other way.

But let careful handling and the most perfect cleanliness be your constant care. The milk house or room should be used for dairy purposes and no other, never allowing any offensive odors to come in close proximity to the milk. No person smoking tobacco or with dirt of any kind on their feet, should be allowed to enter the dairy room, as they will leave an offensive odor that the milk will take up and impart to the cream.

The result will be inferior butter. No difference whether made in a dairy or creamery, the result will be the same, for no dairy or creamery can produce gilt-edge butter out of poor inferior cream. Both have to depend upon the quantity of the cream for the purity of their butter.

So there is no difference which plan you adopt, dairy or creamery, either will pay you, so long as you will observe all of these rules. Good cows, (the more the better), well fed and watered, comfortably kept and kindly handled, the milk kept in the best possible manner to get the most and purest cream. If you decide to sell your cream to a creamery, which I think is much the better plan, if you have but few cows, you certainly will find it to your interest to observe all of these rules. You will find by so doing that "it will pay to keep so many cows," but it will not pay to keep inferior cows, poorly fed and allowed to drink ice water, (and go days without even that), and stand in the fence corners shivering with the cold, then cursed, beat or kicked because they can't stand still while their inhuman owners try to get the little milk they have to give, poor in quality as well as quantity, (which is more than their masters deserve), into a pail used for all purposes, and often a wooden one, or if tin, the strainer attached to the pail, where it is covered with the loose dirt from the cow's udder, then the milk is strained through it into all conceivable kinds of vessels. It is then set in the cupboard or safe standing in the kitchen, where all the different kinds of vegetables are cooked, and the men sit and smoke after each meal, and too often the women smoke all the time they are cooking, skimming the milk, churning and working the butter, often churning for two or three hours, then setting the churn aside to be finished the next day (that day often the Sabbath), and all for the want of a thermometer (costing forty cents) to test the cream and have it at the right temperature—many hours spent in the hardest kind of labor to be charged to guess work. The salting of the butter is done in the same manner by guess; taking up a handful of salt (common barrel salt), and working it into the butter; then they think they have not put in enough, and so put in another handful, and work, slap and smooth it over until it is nothing but salty grease, which they cannot sell for more than ten or fifteen cents per pound, and it is dear even at that price.

I think it would take a pretty smart expert creamery man to make a butter out of their cream that he could palm off on the city dealers as good creamery butter. And those same parties will tell you "it does not pay to keep so many cows." Any wonder?.

Ask them what agricultural papers they take. Their answer will be the same: "It doesn't pay to take a paper."

At the close of the essay the lady was much applauded, and a unanimous vote of thanks was passed and tendered her, not only for the able discourse she had just read, but also for the fact that she had the courage to come before the meeting where she was the only lady present.

The President then called on Col. T. D. Curtis, editor of the Farmer and Dairyman, Syracuse, N. Y., who proceeded to read an essay as follows, on

Missouri as a Dairy State.

I have for years wondered why the middle States do not go more into dairying. I consider them better adapted to this business than are the extreme Northern ones. The very thing that is cited against them is what I consider in their favor—a higher temperature. Of course one cannot successfully raise cream up in the eighties and nineties, nor long keep milk sweet at that temperature. But we have apparatus for setting milk that works equally well whether the weather be hot or cold. We can control the temperature of our milk, and produce equally good results at all seasons, whatever the temperature of the atmosphere may be, so far as handling and manipulation are concerned. Once we were dependent on the conditions of the atmosphere; but that time has passed by.

Our worst obstacle in the production of milk is cold weather. From September to the middle of May, frost and cold work against us. By the latter part of September the frost cuts our pastures and renders our grasses unfit for the production of first-class milk. From September to snow-fall, our pasture grasses have to be supplemented with other foods; and usually by the middle of November we have to supply food artificially altogether until the middle of May.

Here is a heavy tax by way of supplying food to supplement our frost-bitten grasses, and of preparing hay and other feed and dealing it out to the other animals until grass comes again, in May. Sometimes, bnt rarely, in my State, we may turn our cattle out to pasture by the first of May; and then again, we may have to fodder —as we did last year—until the first of June. So that, on an average, we cannot count on pasture grass before the middle of May. From that time until frost comes again, in the fall, a period of only about four months, we usually feed nothing, leaving our cows entirely to the supply of the pastures. But we have leading dairymen who feed a little grain of some kind every day in the year that the

cow gives milk, and declare that they find a profit in it, through the better quality and the steadier and prolonged flow of milk.

The farther north we get, the more this labor and expense of feeding and keeping our cows increases, the season of no frost being shorter, and that of winter feeding proportionally longer.

We are gradually working into winter dairying. In the older and wealthier sections some of the dairymen have provided themselves with warm barns and dairy appliances for winter operations. They must keep their cows through the winter in some way, and it costs but little more to feed for a flow of milk, if we count what is not returned in milk as the cost of keeping. Warm barns save fodder which would otherwise be consumed to keep up the temperature of the animal; and all the extra feed is turned into dairy products.

But if we turn out first-class dairy products, we have to feed somewhat differently, as well as more generously, in winter. We must observe a due balance between the carbonaceous or heat-producing foods and the nitrogenous or milk and muscle-producing foods. And we must do even more than this. We must make up a portion of our rations of some kind of succulent food, so as to approximate pasture grass in composition. We can do this with roots of various kinds, the sugar-beet being best of any, or by steaming cut feed, or by giving a portion of good ensilaged fodder corn. The latter is getting quite popular with many, but its value depends largely upon the manner of growing, and on its perfect preservation—two considerations which cause ensilaged maize to vary fully one-half in value. Cutting and steaming food is not generally practiced. It is too expensive for any but large and wealthy dairymen. But all can grow roots at about the same cost, and all of average means can put in a silo. But I will speak of this again.

By this hasty outline you will see what we have to work against, and will already have made a comparison with the advantages which you have in your State. Our hot months, with which we used to have so much trouble, are July and August—two of the four months in which our pastures are supposed to supply all the wants of our cows. These months may not be quite as hot as with you, but they are often, during some portions of them, months of drouth, during which we must either feed some soiling crop—such as fodder, corn, rye, rowen millet, or other crop grown for the purpose—or else suffer a serious shrinkage of the flow of milk, which cannot be entirely regained, to say nothing of a deteriorated product.

So you see it is a hard and expensive struggle to keep our dairies running, either summer or winter. We have only about two months, or two and a half at the most, in which it is not advantageous to add to or supplement the feed of our pastures, and at least six months in the year we have to depend entirely on foddering. We have learned how to mainly overcome all deleterious effects of heat in the summer, and we are beginning to largely understand how to

overcome the bad effects of cold, by better shelter and proper feed for our cows.

Now, how is it with you, in Missouri? Have you any greater obstacles to overcome than we have?

You have less winter foddering than we have, and all the appliances that we have for overcoming the disadvantageous effects of heat are equally at your disposal. Then why cannot you carry on dairying as well as we? In the matter of winter dairying you have decidedly the advantage of us. You have a shorter foddering season; it is less trouble and expense for you to keep up the animal heat of your cows, by proper shelter, because you have not so low a temperature to contend with, and you have plenty of feed of the best kind. What is to hinder you from getting the best cows, if you have them not already, and beating us, of the North, at our own game?

You cut no inconsiderable figure in the last census. Let me call your attention to a few figures, which will be of interest as bearing on the question which I am considering:

According to the last census, you had 661,405 cows, 9,020 working oxen, and 1,410,507 other cattle—a total of 2,080,932 head of cattle of all kinds. This indicates your capacity for growing and keeping stock. You have run largely to beef. But anywhere that good beef can be procured, dairying can be successfully carried on. And yet, you have not begun to test your capacity.

With your 661,405 cows, you have turned out, of butter—

	lbs.
On the farm,	28,572,124
In the factory,	126,884
In skimmed cheese factories,	13,980
A total of	28,712,988

Of cheese you turned out—

On the farm,	283,484
In the factory,	550,265
In skimmed cheese factories,	39,800
A total of	873,549

The total number of pounds of dairy products was—

Butter,	28,712,988
Cheese,	873,549
Total pounds of product,	29,586,537
The butter at 25 cts. per lb. was worth,	$7,178,247
The cheese at 10 cents,	87,355
The handsome sum of	$7,265,602

And this you did without trying. What might you not do if you went to work in earnest?

Let me show you what New York, the leading dairy State of the Union, did.

She made of butter—	*lbs.*
On the farm,	111,922,423
In the factory,	4,197,424
In skimmed cheese factories,	4,758,354
A total of	120,878,201
Of cheese—	
On the farm,	8,362,590
In the factory,	108,722,852
In skimmed cheese factories,	12,078,272
A total of	129,163,714
At 25c a lb. the value of the butter was	$30,219,550
Of the cheese at 10 cents,	12,916,371
A total of	$43,235,921

So much for the leading dairy State, which begins to give you an inkling of the magnitude and importance of this vast interest. But a glance at the totals for the whole United States will help us to still more fully comprehend our great dairy interest. The census of 1880 showed a total of—

Cows,	12,443,120
Working oxen,	993,841
Other cattle,	22,488,550
Total number of head,	35,925,511

Which is about three-quarters of an animal to every inhabitant, numbering 50,000,000. From our 12,443,120 cows, we produced as reported—

Butter,	806,672,071
Cheese,	243,157,850
A total of	1,049,829,921

The total value of this, counting butter at 25 cents and cheese at 10 cents a pound, was—

Butter,	$201,668,017
Cheese,	24,315,785
Total value,	$225,983,802

Of our product of cheese, in 1882, we exported 147,995,614 pounds, and 81,560,500 pounds of butter. How much was oleomargarine butter and butterine, the Lord only knows. It is worthy of note, however, that we exported very little butter before oleomarga-

rine came into market. Butter for export must go at 22 cents a pound or below. Our total exports of dairy goods amount to about one-sixth of our product. Fully one-half of our cheese goes abroad. Our butter, of which there is an enormous make, is consumed mainly at home. So was our cheese until about 1860, when the factory system sprang up. We then began to make dry, hard cheese for shipping purposes, and so disgusted the home palate and insulted the American stomach, that our consumption per capita was reduced fully one-half. Had we never had a foreign market, and continued to cater to the home demand, we would now be making just as much cheese and consuming it all at home. A foreign market, in the end, works to the disadvantage of any country, however much it may favor certain classes. It is better for every country to supply its own needs as far as possible.

But, are we not already overdoing the dairy business? A few figures will answer. In 1850, we had 6,385,094 cows to 23,191,876 inhabitants, or one cow to 3.63 inhabitants. In 1880 we had 12,443,120 cows to 50,155,783 inhabitants, or one cow to 4.03 inhabitants. Thus it appears the increase of population in 30 years, has been 40 greater than the increase in the number of cows. This does not look much like overdoing the dairy business.

However, we have, in the meantime, increased the yield per cow from 65.77 pounds to 84.37 pounds—an increase of 18.60 pounds per cow; and we have increased the yield of dairy product per capita, from 18.06 pounds to 20.93 pounds—or 2.87 pounds per capita. Though, in consequence of our folly of catering to a foreign market, we have reduced the consumption per capita.

Therefore, I conclude that it will be a good many years before we shall increase our dairy products beyond the limits of normal home consumption, provided we make goods suited to the home palate, to say nothing of what we may find an outlet for in other countries.

But, by the way, I consider it a very bad policy to send the products of our soil abroad. We thereby rob our country of valuable fertilizing materials and get the smallest recompense for our labor—raw materials always selling at the smallest profit, and more especially so when there is a surplus, as there must be when we have them to send abroad.

Our consumption of dairy goods per capita is now 17.47 pounds against 18.06 pounds in 1850—a falling of .59 of a pound per capita, while the increased product per capita is 2.87 pounds. But we must not forget that we have discouraged home consumption during the last 20 odd years, and that we formerly consumed practically all our dairy goods at home when we had a larger proportion of cows to population and made a product that would average inferior to what we make now. Besides, our people generally are better off in worldly goods than they formerly were, and therefore naturally larger consumers of all kinds of fine products. We should there-

fore build up our home markets by providing for home wants and catering to home tastes. We shall thereby secure a reliable market at steady prices. During the last few years the English have growled at the prices of our cheese, and nothing but our large and of late, I am glad to say, increasing consumption has kept up the price. A foreign market, if you must depend on it, is always a low one. It is also a costly one, for cost and risk are incurred in both sending abroad and in bringing back the goods that we buy in exchange. We are taxed at both ends and in the middle, by the traders and transportationists. True economy bids us supply our own wants as far as possible.

But, let us return to the question of capacity and adaptability of the State of Missouri for dairying, as compared with the leading dairy State of the Union—New York. I have compiled a short table of comparisons from the last census, to which I will briefly call your attention:

	N. Y.	*Mo.*
Acres farm lands,	23,780,754	27,879,276
Improved lands,	17,717,862	16,745,031
Average size of farms, acres,	99	129
Value of farms,	$1,056,176,741	$375,633,307
Value farm implements,	42,592,741	18,103,074
Value farm products,	178,025,695	95,912,660
Bushels barley,	7,792,062	123,031
Bushels buckwheat,	4,461,200	57,640
Bushels corn,	25,690,156	202,414,414
Bushels oats,	37,575,506	20,670,958
Bushels rye,	2,634,690	535,426
Bushels wheat,	11,587,766	24,966,627
Bushels Irish potatoes,	33,644,807	4,189,694
Tons hay,	5,240,563	1,077,458
Sheep,	1,715,180	1,411,298
Swine,	751,907	4,553,123

You have more acres of farm lands and nearly as many improved; but we exceed you in values, because of a higher state of improvement, which you can easily attain. With higher cultivation and more than double the amount of machinery, we produce nearly double the value of your product. But you more than double us in the production of wheat; you raise eight times as much corn as we do; grow one-fifth as much hay (and would probably grow more if you needed it); keep nearly as many sheep, and six times as many swine. With your swine as a valuable adjunct to the dairy—with your abundance of cheap corn, and all the hay you want—what is to hinder your making money at dairying? It is conceded that no other business keeps up the fertility of the soil as well, and that no other lifts a mortgage from a northern farm as quickly. Then why may you not prosper in dairying, in connection with mixed farming? You can easily produce your own bread and your feed for your stock.

So your receipts will be nearly all profits and reward for labor, with comparatively small outgoes for machinery and manufactures. Your flock of sheep will supply your clothing, and your garden and orchard will supply you with vegetables and fruit. The last census shows your orchard product to have been valued at $1,812,873. This is nearly one-quarter the value of the fruit product of the old State of New York, which was $8,409,794. Thus it appears to me that you have nearly everything in your favor, as compared with the more northern States. That which has been cited against you, your higher temperature, is actually in your favor, when we consider the improved modern appliances for dairying.

If I do not err in my estimate, all you have to do is to provide yourselves with the best dairy stock, select, breed and rear from your best animals, always feeding liberal and properly balanced rations, to succeed at least as well as any other State in the Union. You must build and provide appliances with the view of controlling temperatures, not only securing an even temperature, but just such a degree as you want. This, I believe, you can do with less trouble and expense the year round, than we can in the more northern States.

I will not attempt to indicate what fodder crops you should grow—you know what you can grow better than I do. Besides, you have an Agricultural college in your State, at the head of which is one of the best scientists in the country. Prof. Sanborn is yet a young man, but he always has his eyes open and his wits about him, and you can rely on him for advice, if you need any.

I judge corn will be a great reliance with you. This is excellent—nothing better—as far as it goes. But do not depend upon it wholly. Few foods, when given alone, are sufficient. Corn is far from being a well-balanced food. There is too large a proportion of fat and heat-producing ingredients in it. Hence, it will do much better in cold than in hot weather, and with cattle much exposed to cold weather than with animals well housed. Whether fed green, or dried or ensilaged, it is all the same, and needs to be supplemented with clover, middlings, cotton-seed meal, oil-meal, oats, barley, or other more nitrogenous food, that will supply milk and muscle-producing materials. There is a great difference in the value of corn-fodder, depending upon how it is grown and in what condition it is preserved. It is not at its best unless grown in hills or drills far enough apart to permit the ear to develop, nor it cut before the grain is in the milk, or after the stalk begins to ripen and looks dead. Whether dried or put in silo, it should be cut between these two periods. The ear is just as much out of balance, as a food, as is the stalk. It contains too much heating material and too little milk and muscle-making material. Some food containing an excess of the latter, must be fed with it. The composition of food and how to compound rations so as to have them properly balanced, you can learn from the feed tables which science has given to the world. I do not know where you can get them in cheaper and better form

than in Prof. E. W. Stewart's new book on "Feeding Animals," which contains a vast fund of information, and will cost you two dollars.

In selecting your dairy stock, care should be taken to get such as is suited to dairy purposes. I will not attempt to say what breed is best—for all have their good points, and in all are good dairy cows. I judge the Shorthorn is popular here, because of its beef qualities. Some families of the Shorthorns are excellent milkers, giving both quantity and quality. They were originally great milkers; but have been bred so long almost exclusively for beef, that, as a rule, they have ceased to be reliable dairy animals.

The Friesians are great milkers—the greatest of all; but it is claimed that their milk is not rich in butter, though it gives a good yield of cheese. I know of Friesians that give milk rich in fat—milk above the average in richness; but I think their milk will average closely with the Ayrshire, while the fat globule of the Friesian milk is much evener in size.

The Jersey gives milk the richest in fat of all the breeds, but the quantity is small, as well as the cow. She ought to do well in your climate.

The Devons are not to be overlooked as a dairy stock. Their milk is nearly as rich as the Jerseys, and there is more of it. I give the Friesians and Devons the first rank as general purpose cows. There is a fair share of beef in both, but more in the Friesian. It is poor policy, however, to keep a poor dairy cow for years because in the end she will sell well for beef. It is holding beef at too high a cost. Better keep a cow, worth little for beef, that will give you $50 to $75 a year in dairy product, than to keep a beef animal that yields only $20 to $30 a year, because in the end she will sell for a few more dollars. Beef should be turned off as soon as it is ready for market. A good dairy cow will keep at a profit as long as her digestive organs remain perfect and healthy.

Whatever breed or breeds you select, be sure that they are adapted to your line of dairying. Don't put a butter cow to cheese-making, nor a cheese cow to butter-making—for in both cases there will be loss.

Again, in breeding, always breed from a pure-blood male, and the best you can get. By this means, you will not only keep up the quality of your herd, but in time have a practically pure-blooded one; and if you are careful in selecting both your bull and the calves you raise—always supposing that you feed and shelter properly—you will be pretty sure to improve your herd. I have known of herds brought up in this way from a yield of 100 and 150 pounds of butter per cow annually, to 250 and 300 pounds. Of course, the yield of cheese can be correspondingly increased. I do not consider a cow really profitable if she does not turn out 5,000 pounds of milk a year, of good quality.

Good water is essential in the dairy, but a comparatively small quantity will answer the purpose. Whatever goes into the dairy product must be free from deleterious substances, and the cows must have good water to drink. If you have not springs and streams that will furnish a supply of good water, wells and windmills, I judge, will supply the deficiency. If these fail, prepare a cistern for rain-water, with a filter in it. If kept clean, this will furnish excellent soft water for drinking purposes and for use in the dairy.

In conclusion, permit me to say that I think there is every encouragement for going into dairying in Missouri. It is one of the grandest States in the Union, and its resources are far from half developed as yet. I predict that it will one day equal if it does not lead any dairying State in the Union.

At the conclusion of the essay, a number of delegates desired to ask questions pertaining to the proper feeding of dairy cows; but as the day was far advanced, the meeting adjourned to meet again at seven o'clock.

EVENING SESSION, JANUARY 30.

President Colman called the meeting to order at seven o'clock. The first speaker was Prof. Sanborn, who reported that he had been appointed statistical agent by the Department of Agriculture for the State. He said:

Every State about us has an established system of reports, made every month by the farmers, of the condition of the crops in their districts, and the probable yield. It has not been established in this State as yet, and I would like as many farmers as can to send me reports. I have some correspondents, but there are as yet some districts not covered. The blanks for the reports are sent out, and the postage is paid. The correct reports of the condition of crops has become a matter of national importance. I have a list of 200 now, but some counties are not reported.

President Colman—Before the adjournment, we were discussing the feeding of stock. If you wish to continue the discussion, I will call upon some of those present to give us their views. I will call upon Mr. D. Douglas, of Jefferson County, Mo.

Mr. Douglas—I have no regularity about the kind of feed I use, that I know. My first aim is to get all the good grass I can. There is nothing equal to good grass to give the proper flavor to the butter. That was the chief reason for my starting my dairy where I did. I wanted a locality where I could get early and late grasses. I don't use corn fodder. I tried it in a cured state, but didn't succeed with it. I use bran and corn meal in winter time; have used cotton seed, but without good results. My best results have been with hay and corn meal and bran, mixed. I have never tried oat meal, as we do not raise oats, and the meal is too expensive. One year, I know, we cultivated corn; cut and cured it and put it away in the barn, and I found when I turned from hay to corn stalks the cows did not give as much milk. Since then, I have not made much effort in the use of corn fodder.

Query—How did you cure your corn?

Ans.—Cut it in the field and hauled it up when dry. Corn stalks should be ripe before curing. I tried feeding green corn during a drought. The cows ate it rapidly, but I found it did not increase the flow of milk one atom, though it increased the flow of urine wonderfully. I sowed the corn broadcast; grew it thick, and cut it before it eared.

Query—When was the corn cut?

Ans.—In August.

Col. Curtis—All it was good for, then, was to make water?

Mr. Douglas—I have since confined myself, during drought and in winter, to hay and bran. I find grasses are better than clover. Red clover will give you a soft, spongy butter, with much water in it that you cannot get out. It is a fine fertilizer, but is not good to feed.

Query—You fed nothing but clover?

Ans.—I did, and have always found the result as I have stated. I don't want clover, white or red, about my place, except to be used as a fertilizer.

Col. Curtis—If you had fed some cut corn stalks with the clover, you would have had good results.

Mr. Douglas—I consider timothy, blue top, blue grass and orchard grass good varieties. Orchard grass will furnish the best feed for cows. Blue grass, I think, is the best variety; but it dries up, and we only have it in early spring and fall.

Col. Curtis—But won't blue grass run out?

Ans.—I think it will. The reason I think a little south of here is the best locality for a dairy, is on account of these grasses. The great advantage of having a number of varieties is, that they do not all mature at once; but one variety follows another in reaching maturity.

Mr. Drury, of Illinois, said: I use cut sheaf oats, bran and crushed corn and clover hay.

Query—How much bran do you feed?

Mr. Drury—I mix two-thirds bran and one-third corn. When I bring my cows back from water, I always give them a small measure of dry bran. I like clover hay as a feed, and have always got good results from it. My cows are Jerseys, and they give milk enough to make a pound a day each. I think it is best to have mixed pastures. I sow orchard, timothy and blue grass, and I find the cows will pick out the orchard and blue grass, and leave the clover till the last. I have a piece of grass 18 years old. I would recommend you to sow your orchard grass thick (some recommend two bushels to the acre); if you sow it thick, there is no danger of its running to tussocks. Sow about ten pounds of clover seed to the acre with the orchard grass.

President Colman—Have you tried raising corn for fodder?

Ans.—No sir. I feed my cows twice a day, in summer, with dry bran.

Query—Do you think scalded bran better?

Ans.—No; you had better feed it dry.

Profs. Curtis, Smith and Sanborn did not believe in cooking food for cows.

Mr. Hobson, of Illinois—I have had an extensive experience in dairy farming, and I think cooking the food is very essential to obtain a prolific flow of milk. Those who go into this business should study the locality. Blue grass is not good for anything where

I live. I have a monkey prairie soil. It makes a good feed in some seasons. It is good in May and June. After that I let it grow until September, when I turn the cattle on. Clover and timothy are what we need, and for piecing out in a time of drought I sow corn. I begin about June 1st, and sow every two weeks. I plant it thick, and let it grow to near the nubbin and then feed it. One acre, sown broadcast, will raise a good crop. Sweet corn is the better variety. Sugar cane nas been recommended, but I never tried it.

The reason I put clover and timothy together is, you can't cure clover alone, as the body is too heavy. Timothy dries easily, and absorbs the superfluous moisture of the clover and dries out again. When the clover is properly cured, it is the best feed I can get.

Query—Wouldn't orchard grass be as good as timothy?

Ans.—I have had no experience, and cannot say. As to the quantity to be fed, I will say I think the cow's bag is the best thermometer to feed by that can be found. There are not two men on my place that eat the same amount, and no two cows ever ate the same quantity. You don't want to let your cow fluctuate in the quantity of milk she gives. If she fluctuates either way there is something wrong. Over-feeding will dry a cow up quicker than under-feeding. Bran will give milk but not flesh. If you can raise other things, don't use it. It may do in Vermont or New York, but not here; let it alone. While they raise more corn and wheat to the acre in the east than I can, I know I can raise it cheaper.

Query—Do you believe in cooking food?

Ans.—Yes; While those people in the east have quit it, I I think it will pay here. In New York, I remember, they didn't dairy in the winter. They have a more even climate there, which is favorable to the business. Here the climatic changes, so hard upon the man, are worse upon the cows. Practice is better than theory all the time. Cooking food serves to build up the cow when she is inclined to give down, and keeps the flow of milk regular. A cow is a very sensitive animal. She has been likened to a milk-making machine, and I tell you she is the most delicate machine we have to deal with. I know of dairies where you would not be allowed to talk loud in the yards, so much do they guard against alarming the cows. I do not state from theory; I state from facts when I say that cooking food is better for the cow. I know a man who said it would pay to feed 50 cents corn to a $4 hog. He had tried it, but didn't weigh either the corn or the hog. I have not experimented that way, and I have fed all kinds of feed—bran, shock corn and everything. You want to give the cooked food at the same temperature every day. I feed corn, cobs and all. While I don't suppose there is a man in the room that will agree with me, I say I would as soon have cobs and all as simply shelled corn. The cow, as I said, is a machine. Graham flour will regulate a man and keep his digestion good. The cob will regulate the cow. I always grind the cobs fine—it doesn't do to chop them. I use a mill

adapted to this purpose. The Little Giants won't do any good. You might as well use a pestal and mortar. I am not a butter maker or a cheese maker. I ship milk, and am paid for that milk, according to the richness of it; but I ship it, regardless of its butter-producing qualities.

As to stock: I began dairying with a mixed-up lot, and have found that the breed is in the feed. I would rather have a corn crib and a hay mow than the best herd in the country. I wouldn't have a Jersey for milk. There is much discussion as to the proper breed for the business, and there has been much said about a "general purpose" cow. You can't get an extraordinary cow in every way in one animal. We want—and Short Horns will never be beat—to breed from a milking family. Holsteins are coming up and are really good. I used to have a Short Horn—to illustrate the difference in cows—that was just as pretty as a picture, but wouldn't give any milk. Another common looking beast was the finest milker I had.

Mr. Piersol, of Monroe City, Mo.—Sometimes we learn a business by success, and sometimes by a failure. I have been in Missouri eighteen years, and have been thirty-six years in the business. The greatest difficulty I have had to contend with is droughts. I have tried many ways to get over it without shrinkage. My farm was a newly-seeded meadow—seeded to timothy and clover. I found that when it ripened and dried down that there was nothing to feed. I had a pasture in which blue grass was sown. I did not let anything in it after May. The dry spell came on about August 31, and I turned my cattle on the blue grass pasture. They did not shrink a bit. I think this is the best method I have found. Next to that, I think green cut timothy and clover is the feed. I have used a mixture of rye, oats and corn; grind it all together and feed it. The blue grass, when it grows up, falls down and covers the roots. I have found red top to be the best grass for summer time. Mixed clover and timothy is the best for hay, cut green. I have repeated this time and again. I have not tried orchard grass. You should not cut hay too early. In timothy, you should cut when the blossom comes and the head begins to brown. If cut too early it will spoil in the stack. I keep clover down in the spring, and let it grow up and ripen with the timothy. I have charge of a creamery, and have 20 to 30 cows. During the past season we nearly had a failure in August and September, because the farmers were not prepared.

Mr. Lourterman, of Illinois—The question of locality is a serious one to be considered in establishing a dairy farm; and when established, the needs should be carefully studied. Two or three years ago I tried, on my place, feeding Jerusalem artichoke. It doesn't make the tuber until late in September; but that makes no difference, as you feed the blossom. I have been using it ever since, and find enough tubers to seed the ground with. While I was feding this the cows gave a fair quality of milk, from which we

made good butter. The tuber produces a good color and flavor in the butter.

Mr. Sawyer—You have heard much about the dry season, and I tell you you will learn before five years how to tide over these seasons—I mean with ensilage. I have a small silo on my place, and I brought some samples that I made last season. They have been pronounced by experienced men good specimens, though not strictly first class. This is the way I work it: I sow in the fall a small crop of rye. By June it will be ready to go into the silo, and I cut it and put it in. This gives two months for it to remain there. When I began feeding it to my cows they increased in milk. When your corn is ready to put in the silo the rye is out. The rye should be grown while the cows are in the pasture. I am afraid I am taking too much of your time, but I've got the fever bad.

He was asked to continue, and said: Mr. Hobson spoke of bran. Now, I'll tell you: Two or three weeks ago one of my cows did not feel well and would not eat her ensilage. I fed her some bran, and then, after a while, she ate some ensilage, and it wasn't very long before she was eating just the same as before.

Mr. Thompson, of Missouri—Prof. Sanborn, have you ever seen ensilage fed in summer?

Prof. Sanborn—I have, and the cows eat it in preference to hay. The ensilage question is quite an open one. I have seen much of its use, but have not experimented directly with it. Most advocates of ensilage are extremists, and will not listen to any other side of the subject; but, in a word, it is feeding six pounds of water to one pound of fodder. Cooking food has been referred to, and I feel like entering my protest to it. It is not profitable. If anything has ever been demonstrated it is this. If you review the history of amateur farming you will find the cooking of food a pet hobby. I visited the farm of Hon. Mr. Cochrane, in Kansas. He has four cows worth $125,000. I saw near the stable a chimney like a smelting furnace stack. They had formerly cooked their feed there, but abortion and sickness resulted. They had to send all the way to Denver for a veterinary surgeon. A man with four cows worth $125,000 won't cling to a hobby or a chimney very long when he sees they are not the right things. There have been scientists who have given years of study to this thing—the fermentation of food, etc.; and the general verdict is: it does not pay. It was tried very thoroughly at the Maine Agricultural College. I used to have a great many pet notions, but when I began experimenting I found I had to give up those notions. I used to believe that hay ought to be cut early. It is sweet, like cake, and cows will eat of it largely. You will find that when you begin to give the cow late cut hay, after having fed her the early cut, she will not eat more than two-thirds her usual rations; but will eat more the next week, more the third, and so on to the maximum. The experiments of the Maine Agricultural College extended over seven years. They tried cooked

and uncooked meal, and found it all on one side. Now, on the question of crushing: I wouldn't give a dollar for all the crushers in the country. We want burr meal. Use the corn cracker first and then the mill. I use the meal as fine for my stock as for myself. Do not feed a young pig anything coarse; always grind the fodder. I do not feed the cobs with corn, as the results of my experiments do not justify me. As to corn fodder: I put three sets of cows in pasture on hay and corn fodder, and weighed the milk. I found it was better to feed the dry fodder at the bin, and it was cheaper. There is too much labor connected with the handling of the wet fodder.

Senator Morse, of Jefferson County—What do you consider "early" and "late" cut hay?

Ans.—I call it "early" when cut while in bloom, and "late" when cut after the seeds have begun to form. It will seed after it is cut, and should not be allowed to mature. The seed of the hay goes through the cow undigested; so the hay should be cut when the seed is in the dough stage. It has been held that hay does not increase after it blooms. I have found it increasing as much as 40 per cent. You can try the same experiment by laying out alternate plots 40 rods wide and weighing the product honestly.

Col. Curtis—If the seed forms it exhausts the root of the plant.

Ans.—I do not think so. I have heard that a timothy field will be injured at the roots if cut before maturity.

Hiram Smith—Late cut hay may prove richer, but it is not more nutritious.

Prof. Sanborn—I claim it is though I am opposed to other scientists. Starch, sugar and gum converted into woody fibre, are not lost, but only changed in position and improved. We used to think a plant got its full development early. I have had experiments with 10 cows, and from these I have had answers to my questions. I would not advise late cut hay for butter, early cut hay colors it better. A quart of milk made from hay out of bloom will make more butter than hay in bloom.

Mr. Adams, of Missouri—I have cooked feed for five years, and I think that it pays. The feed costs ½ cent more when cooked than otherwise. I have tried soiling corn and like it.

Mr. Douglas, of Missouri—I remember the time—in the thirties—there was a universal desire for everybody to have steaming boxes. They went into it more generally than they build silos now. That was the way they put water in the food. I am afraid of ensilage and have never used it.

President Colman then changed the subject of discussion by calling on Mr. J. B. Thompson, of La Plata, Mo., to speak on Co-operative Dairying.

Mr. Thompson—I had not prepared an address, but I was given notice by your Secretary after I came here that I would be expected

to address you. I have noticed, since I came, that the tendency of the discussions has been to feed, and little has been said of creameries, that feature of the business that is growing so largely and becoming such a factor in connection with our farming interests. In our creamery we make good butter, not perhaps, gilt-edge, not as good perhaps, as the best Elgin butter, for within the bounds of that Association there is more experience. All the creameries in Missouri are young and new; the industry of butter and cheese making obtains but little attention, except in the farm houses. The business is carelessly carried on; but we are moving, I believe, and will eventually succeed in perfecting our creamery system. It is progressing even in unfavorable localities; take for instance Saline County, where they raised last year 100 bushels of corn to the acre, they are progressing. I wouldn't like to go into a business in which nobody had failed, I only want some facts and experience that others have gotten. The markets are flooded with imitations of butter in spite of the strictest laws. Personal honesty must be the guaranty of the good quality of every pound of butter sold. No matter how poor a man is he wants good butter, and you would rather take a pound of butter from a maker you knew to be a successful maker of butter; you never knew of any one to call for bad butter. The question, though, is how to get it to the consumer who does not know the maker. Oleomargarine has the start of us. I saw some in a restaurant this morning, I asked the proprietor what kind of butter he used. "Ohio Dairy," he said, he paid 25 cents a pound for it. I told him what it was and offered to sell him some real good butter. "What guaranty have I that your butter is better than this," was his question. There is the hitch, Elgin, Ills., is in the center of a vast number of dairies, they have a regular exchange and sales of the products which are inspected and marked with the inspectors guaranty. The sales on 'Change amounted to $42,000 in a single day, and these sales were at prices a long way ahead of our butter. I wondered why this was and finally I came across the following extract from a speech delivered by the Secretary of the Association:

"In 1876 or 1877 Dr. Phelps objected to sending any more butter on commission, as we were continually being swindled. Well, what were we to do while so many dealers were working against us and would not even visit us and see what we had and were doing. But we went to work and advertised, wrote up the subject of dairy interests and what we were doing and published it in our local papers and in the Chicago papers. Discussed the subject among the farmers and at school houses got people interested. The farmers bought cows and our business increased, and just as we were about to send out a salesman to sell butter and cheese by samples, three or four dealers came in from St. Louis and bought all we had. We published the sales and at the next meeting other dealers came and bought, and so on. In 1872, when our member-

ship was only twelve, we sold $81,000 worth of butter and cheese. In 1873, we sold $219,177.53, and in 1882 we sold $2,752,231.56, making over $2,750,000 worth of butter and cheese for 1882; commission on this at 5 per cent. would be $13,750 for one year saved by the board of trade. Remember, in addition to this, the several towns north, east, south and west are sending to Chicago daily 8,000 to 10,000 gallons of milk, besides the 5,000 or 6,000 gallons condensed milk by the several factories near us."

The subject of dairy farming in this State has been given a strong impetus, given us by the papers of the country in doing likewise. Is it possible to part with such support. Last year we made 200 lbs. of butter, where this year we will make 1000. Our market is limited, and as creameries are being established around us we will have to find means of extending that market. We will have to organize, have an exchange and sell with the brand of the Associations upon our product. The markets of the world should be open to us. Look at the map and see how small a portion is adaptable to the need of this business. It was formerly the custom for every farmer to make his own soap and sell some of it, too, now who thinks of buying anything but factory soap. After a while all the butter will be made in creameries; creamery butter is sold too high. A friend of mine told me he paid 50 cents a pound for it; he should not have paid more than 32 cents, the other 18 cents was for integrity, and the jobber got it. We must deal more directly with our consumers, and if we cannot succeed in this the whole system must fail. Why can we not have refrigerator cars on the railroads to run from one creamery to another. We sent our product to market last year in a refrigerator car for 50 cents, where before it had cost $1.50.

Col. Curtis—The refrigerator car problem is easy enough, let the railroad companies know you want the cars and you'll get them.

Mr. Addy, of New York—We get butter from the farthest corners of Missouri into New York City in better condition than from the central portion of New York. Four years ago foreign export was not satisfactory. A Yankee tried the experiment of a refrigerator section in the hold. It was a success, and now every ocean-going steamer has a refrigerator. Our butter is now the first in the European markets, if it were not so there would be a disastrous over-production. There never has been a time when good butter would not sell; co-operative dairying is a good plan; there is no other way to work successfully. Two men will do the work of 200 women, and do it better. There has been butter sold here by the car load for 7 and 8 cents a pound, and the milk from which it was made was just as good as that which made 30 and 40 cent butter. Large failures in this business result from trying to take too large a bite of the cherry. A man who runs four or five teams collecting his milk at a cost of 5c. a pound will fail. In Wisconsin, where butter sells from 32 to 40 cents a pound, the

winter comes early, stopping the operations. Here winter dairying ought to be the specialty, as it is possible to run the winter through, you have the end in the winter and the worth in the summer. Better butter is made in the west than in the east, though it was once thought impossible to make butter west of the Alleghaneys. Chicago is the best butter market in the world, but creamery butter has no chance there, it is kept at such a high price by the schemes of the butterine manufacturers, that it cannot be sold. The Elgin people have got themselves into bad favor by doctoring their market, they have orders from New Orleans at the ruling price. A offers 10 tubs of butter at 35 cents; B buys it and sells it to C at an advance, and when the price comes back to A the matter is adjusted and the price is run up from 35 to 50 cents without a single actual sale of butter. All Elgin butter does not go out under one brand, it comes from anywhere, and is sold by sample. You never see the irregular sales quoted, only the regular. In New York they have a law that all imitations of butter must be marked with two inch letters. The manufacturers get around this by stamping their butter firkins with two inch letters as thin as a hair. The butter goes to a dealer, the firkin is knocked off and the butter stands unmarked upon a slab.

Butter is never so good as when fresh, and the better it is the more will be consumed. The trouble in this business is getting too deep into it. It doesn't take a pot of money to run a creamery. The man who sells you the outfit will sell you what he can. You don't want a house big enongh for five hundred cows when you have a hundred.

As the hour of ten had arrived the meeting adjourned, to meet again next morning at nine o'clock.

SECOND MORNING SESSION, JANUARY 31.

Mr. Douglas, of Missouri—My knowledge has been gained through experience. You have been well posted as to the analysis of feed, etc.; but in order to have you fully understand the system of making butter south of here, you ought to know something of its history. I commenced in this business at a very early age, and while a mere boy froze my thumb while milking. I was born in Vermont, but if I had had my choice I would have been born in Boston. When I grew up I went to New York to buy buttter. They made butter there as white as lard, and very bitter. This they kept until fall, and then they would sell it to the buyer, who came around trying and buying the stuff. This was the first system of co-operative dairies. Previous to that time the farmer would bring his product to the country store for sale. In 1857 I came to St. Louis to sell New York butter in this market. I could get no good butter except in Ohio at that time. In 1858 I went into the butter region of Illinois and bought 100 lb. packages near Galena at 4c a lb., delivered in St. Louis. They were then packing the butter in boxes and kegs. I commenced advising them to dairy pack it. I had circulars printed, giving instructions for making and packing good butter, and had my buyer distribute them. It did me a great deal of good. They made good butter, and I bought it cheaply. By educating the people I succeeded in getting a good quality of butter before creameries were started. Some years later they organized the Northwestern Dairymen's Association, and one of my buyers was the originator of the scheme. So much was I interested in the growth of the butter industry they used to tell me my nose became crooked from smelling butter. In 1874 I determined to buy a farm and make butter. No butter, it was said, could be made south of a line rnuning from Northern Pennsylvania below the Western Reserve of Ohio and Northern Indiana. I never believed that, and only considered my surroundings in purchasing my farm in Jefferson county. There are three streams running through it, and there is no pasture, field or lot, that has not a stream on it. I commenced with the large pan system in my dairy house. I constructed wooden tanks, 8 feet long, 4 feet wide and a foot deep; pans, 7½ feet long and 2 feet wide, set in the water; the pans were provided with tight covers, so I could submerge them and bring the milk to the temperature of the water. I flow water from a stream through the tanks, and use neither jars nor ice. The temperature of the water is always even, and from one year's end to the other we don't have a pound of spongy butter. It is as uni-

form as it can be, with varying feed. I bought, for stock, 16 Jerseys and grade Jerseys, in Kentucky. I have always received 50c a pound for my butter.

The necessity for creameries has been warmly urged; but I think the man who cares to, can make better butter in a dairy. It is less expensive to churn the milk of 50 cows than to take it to a creamery. A child 15 or 16 years old can care for the milk. Cultivation of grasses is the most important part of dairy farming. If you have good stock, good grass, and keep everything about you sweet and clean, you can't help making good butter. You should cultivate a great variety of grasses, that they may mature at varying times. My principal object in locating in the south was, I knew I could get two months more feeding there than anywhere else. You can make good butter ftom dry feed, but it will not equal that made from grasses, either in odor or in color. I don't use coloring matter, though I don't object to its use. There is a prejudice against it in my trade, and generally. All farms are not as well supplied with springs as mine, but it is likely there is a good well on the place, and a windmill, and large tanks can be used. The water will not materially change its temperature in 24 hours. If there is no well, and he has the side of a hill, he can use Prof. Wilkinson's idea—a cold air duct into the dairy-house through the hill.

Prof. Sanborn—Are there any houses built on that plan?

Some, I think, in Illinois. The air is conducted through a passage in the earth, and is cool in summer and warm in winter. If you have no hill-side, you may construct the walls of your dairy-house double, with three air chambers made as tight as possible. Valves at the top may be opened at night and closed during the day. The air will not heat rapidly, but will keep the rooms cool. These ways of keeping the dairy-house cool effect the same result, and no matter which is used, good butter may be made if you manage correctly. I have built my house into a hill-side, and the walls are constructed with air chambers of cement half way up. I find, in summer, it is cool enough with the windows open. The temperature never rises above 70 degrees, or goes below 40. I would not advise any similar system, nor would I, if I was starting in the business, adopt any system of the sort. There is a better way—a Danish invention called the centrifugal separator. The milk is put in and whirled around, as soon as it comes from the cow, the butter globules separating from the milk. From 10 to 12 per cent. more butter is obtained in this way. Our milk is nearly all from Jerseys, and the yield was 15.1 lbs. milk to 1 lb. butter.

You have been advised of the necessity of getting the right kind of stock, and I would impress the value of this item on you. I never made cheese in my life, and little has been made near here, because there are no curing houses, though they ought to be constructed. The houses are mostly of rough

boards, and so general are the failures the dealers think a fine-flavored cheese cannot be made in this locality. The centrifugal machine, of which I spoke, can be set in a corner of the building. It works like a top, and makes about 5,000 revolutions a minute. As] the disk revolves the milk flies off the surface, and the cream flows down the center. The owner of the largest herd in New Jersey—has 100 cows, worth $1,000 each—has adopted it, and says he gets from 10 to 12 per cent. more butter than by the other system. The increased quantity of butter in an average dairy will pay for the machine in three months. The smallest costs $250, and will work up 600 pounds of milk in an hour. With this machine, you can dispense with expensive buildings, etc. If I was going to start a creamery I would not be without this machine.

Query—Is the centrifugal machine applicable here?

Mr' Douglas—I know only this: you can run your milk either warm or cold, sour or sweet.

Prof. Sanborn—Carted milk can be better handled by a centrifugal machine than by any other system. Experiments show that a much larger per centage of butter can be obtained by this means.

Query—Do you raise your calves on sweet milk?

Mr. Douglas—The first month I give them sweet milk; then mixed sweet and poor milk. I never feed them sour milk.

Mr. Sawyer, of Illinois—I would like to know if any one present has heard anything against the centrifugal machine. We have heard nothing here but praises of it, and if there are any objections to it I would be glad to hear them. My reading of it, too, has all been on one side.

There were no answers to the inquiry.

Senator Morse, of southern Missouri, was introduced by the President, and said:

I saw a notice of this meeting in a paper, and though I had not been invited I came out of curiosity. You have heard lots about latitude, and it used to be said that good butter could not be made out of the 38th or 37th parallel. I was born in Massachusetts, and came here in November, 1837, when a young man, and I think I am quite a young man yet. Since '37 I have lived in southern Missouri, which is, as you know, a high rolling country. No State in the Union has a better interior water system than Missouri, and no State has the same amount of water power. This is a country especially adapted to the dairying interests. While Missouri has ever been one of the United Ststes, it has not always contained a united people. The building and the growth of the State has been chiefly in the northern portion, and the people have been educated to believe the southern part of the State contained nothing good. We have no hotter weather than they have in Massachusetts. There is no finer country anywhere than Jefferson, Franklin, Washington, and a few other counties, nor a country better adapted to making butter. There is grass to be had in spring, good hay, good corn

fodder—all combining to make good butter. The way to feed corn is to plant it in April, May and June; cut it when it is of the proper size, and then let it dry in the field till all the water is out of it. Cows, you will find, never run away from early-cut hay, but they might from late-cut hay. In this dairy business, there is one thing we lack, and that is education. Our boys think it is degrading to milk, and our girls think it is beneath their dignity to care for the milk. They should be taught what it takes to make a dollar, and what it is worth when it is made. Option deals, commission for handling produce, bank requisites, are simply thefts from the laborer. We are too little an exporting people, and too much an importing people. The increased population gets away with the increased dairy product. Soap grease has always been an exportable commodity, and if the snobs want it for butter let them have it, but here at home the people want good butter.

This is a grand, good country, and the rate of its increase in population is marvelous. I was a wagon boy when there wasn't a railroad in the country, and rode on the first road ever built here. In 1861 there were 30,000 miles of rails, and in 1883, 114,000 miles. In 1861 there were 25,000 miles of telegraph wires in use, and in 1883, 83,500,000 miles. What nation of the earth is going to compete with us when we undertake to do or dare anything?

Mr. F. F. Hilder, editor of the American Trade Journal, was itroduced as the essayist of the morning, by President Colman, and read his paper on

THE SOUTH AS A MARKET FOR DAIRY PRODUCTS.

It is hardly necessary for me, in such an assemblage, to speak of the importance of the trade in dairy products, when one of our Western States alone produces, in more than 400 creameries and cheese factories, articles valued at nearly $16,000,000. I refer to Illinois, when, in 1882, it was reported that 716,100 cows were owned, worth over $26,000,000. These great array of figures would swell to enormous proportions, if the statistics of all the States in that immense district, we include the Mississippi Valley, were collected and totalized. Such figures are surprising, when we consider how recent are the establishment of creameries and other arrangements systematizing the business. It is only some eleven years ago that the first creamery was built in Iowa, at Manchester. There are now nearly 800 in active operation in that State.

An industry representing such large investments of capital, and such great commercial and agricultural interests, and exercising such important influences on the prosperity of the whole United States, is well worthy of the closest study on the part of all those directly interested in it, and should receive the greatest consideration from legislatures and the press, in order that it may be protected from wrongs from without, and be elevated by the dissemination of intelligence from within. Such conventions as these are of the greatest

value, not only to those engaged in the business, but directly beneficial to the public at large. I will venture to say, that no man ever attended a convention bearing on the subject of the business he is engaged in without adding some valuable ideas to his stock of information which enable him to derive more profit from his operations, and to benefit the public by putting better goods on the market at more reasonable prices.

I promised your Secretary that I would say a few words to you on the "South as a Market for Dairy Products;" but before addressing myself directly to the subject, I wish to make a few general remarks. There is no doubt that one of the greatest obstacles that the trade has to contend against at present is the adulteration of butter. When oleomargarine was first brought to public notice, it was approved as affording the means of deceiving buyers, and laws were passed in several States prohibiting the manufacture and sale, unless it was distinctly branded with the name oleomargarine. That was bad enough, but it was pure as a saint in comparison with the villainous compound that has since been introduced, termed swine or butterine, and manufactured in Chicago, of lard, cotton seed oil, and grease of various kinds, with just enough genuine butter to pass it off on the unwary.

Just so long as dealers can make an extra profit by handling this abomination they will do it, even though it kills their trade in the genuine product. I looked over the reports of the late Dairymen's Convention, at Cincinnati, expecting to find some reference to this question, and must confess that I was very much surprised that I could find nothing on the subject. If the producers of good, legitimate dairy butter wish to protect their interests and find new markets for their products, it is time for them to look this subject squarely in the face. It is time for the agricultural press, agricultural boards, and dairy organizations of the country, to set their feet down heavily, and lend their aid to crush frauds and counterfeits of all kinds.

In a recent tour through the South, when I asked a question about extending the trade in northern produce, I was frequently told that they were willing to pay a higher price for home products, or go without butter altogether, than run the risk of consuming these abominable products of the Chicago stock yards under the disguise of butter.

With respect to cheese, there is also a great deal to be done before the trade will assume anything like the importance that is its due. Great as is the amount of cheese produced in this country, it is a mere trifle compared with the demand that might be created if greater attention is paid to the manufacture. Americans are not a cheese-eating people, for the simple reason that they find it difficult to obtain a cheese that they like; and yet cheese is one of the most nutritious and economical of foods. It contains as much of the flesh and muscle-making elements as beef, and has the advantage

that it does not require the expense of fuel and labor to cook it. Greater variety in the kind of cheese manufactured, and greater attention to producing a similar and regular flow in each variety, with increased attention to the curing, would do much to increase the demand. Multiply the varieties of cheese so as to suit the varied tastes, and you will multiply the number of cheese eaters in much larger proportion.

I do not pretend to any technical knowledge of dairying or cheese-making; but it is my business to watch the commercial aspects of the various interests which go to make up the business of the nation; and in so doing, I cannot help feeling the deepest interest in so good a branch of productive industry.

That interest has been largely increased, as I have noticed, during the past year, the steadiness and stability in the trade in dairy products.

Notwithstanding the depression that has prevailed in almost all branches of trade, and the large shrinkage in values of merchandise of every description and of nearly all the leading articles of food, dairy products, and cheese in particular, have been remarkably steady, and in this particular have found a notable exception to other products.

The New York Shipping List says that the exports of butter from the United States, this year, have been nearly, or quite, 100 per cent. larger than last year, while the average price for the year is not more than 2½ cents per lb. less. The exports of cheese have not increased, but the price has averaged a fraction of a cent more per lb. The amount manufactured in New York State was much larger than in the preceding year, and the decreased exportation from the port of New York, was caused by the largely increased shipments to Canada and the South and West.

After the subject of production, that of finding a market is of the greatest importance, and here, gentlemen, I am happy to say, the prospects before the dairymen of the Mississippi Valley are very bright. The Southern States are progressing with most wonderful rapidity; new manufacturing enterprises are springing up in every direction, and new towns arising with vigorous growth, that reminds us more of the newly-opened regions of the West than the hitherto unprogressive South. The demand for dairy products, of course, must keep pace with the increase of our manufacturing population. It is true that the increase of dairy farming in the Southern States is very large; in fact, surprisingly so; yet the demand keeps far ahead of the production. Take the State of Mississippi as an example: In 1870, the butter produced there was 2,613,521 lbs. In 1880, that had increased to 7,454,657 lbs. In the same time the population had increased 36 per cent., and manufacturing industries have multiplied in far greater ratio. Cotton mills are being erected; woolen mills and oil mills established and enlarged, and a great movement is in progress to utilize

the magnificent growth of timber, by erecting saw mills. In the past year, 450 miles of railroad have been built in the State—all these industries being consumers of agricultural and dairy products. Georgia and Alabama are also developing into great manufacturing States. Louisiana, with the great city of New Orleans as a port of export, the great future of which we can hardly yet realize; all present growing markets for butter and cheese.

In the efforts that are being made to extend the export trade of New Orleans, are centered the brightest prospects for the extension of the foreign markets for the products of the Mississippi Valley. Few persons are aware of the amount of effort that is being expended in that direction, or the progress that is being made.

Regular lines of steamers are now running between New Orleans and the ports of British Honduras and northern and eastern Spanish Honduras. A steamer has also lately been started to run to the gulf ports of Costa Rica and Nicaragua. The Mexican Navigation Company are building a steamer in England, which will be finished in September next, when she will commence regular trips between Vera Cruz, Galveston and New Orleans. In addition to these facilities, there will soon be others. A convention has been called by the Exchange of New Orleans, to meet in that city on February 20th, for the purpose of extending commerce with Central and South America, and taking measures to put on another line of steamers.

From the rapid development of Mexico and Central America, there is no doubt that as soon as there exists adequate lines of communication with New Orleans, every producer in the Mississippi Valley will feel the beneficial results.

In looking through a list of exports from New York, for the week ending January 8th, I noticed a shipment of 18,844 lbs. butter and 6,397 lbs. cheese to the United States of Columbia. This is, doubtless, supplies for the men engaged on the works of the Panama Canal. There are now over 10,000 men employed on that great enterprise. All their supplies of provisions should be drawn from the Mississippi Valley, through New Orleans, which is only 1,300 miles distant from the canal entrance, instead of making a voyage of such great length from New York. The only reason why this is not done is, that New York has steam communication and New Orleans has not. But in the near future that deficiency will be remedied; when it is, the Mississippi Valley will begin to enjoy the benefits of the trade that is her due by geographical situation. In the week ending January 8th, to which I referred a few minutes since, the shipments of butter from New York amounted to 175,020 lbs., and of cheese to 128,052 lbs. There is no reason why this Valley should not export something approximating these figures when our direct export trade is developed as it should and will be. In addition to the Panama Canal, there are other great enterprises which will be undertaken in the near future—Eads' ship canal across

the isthmus of Tehuantapec, the Mexican Tehuantapec railroad, the railroad projected by the government of Guatemala, from the Gulf of Mexico to the Pacific. These great works will give employment to thousands of laborers. The produce of this Valley should feed them.

These are but hasty glimpses of the prospect which the future will unfold to us, of the commercial importance of the Mississippi Valley; but I have said enough to introduce the subject fairly to you, to lead you to turn your thoughts towards the direction in which the great streams of business in your products will flow in the near future. It is for you to prepare yourselves for the demand that will surely arise. The capacity of this great region for producing butter and cheese are almost unlimited. Within a few miles of this city there are thousands of acres of cheap lands, admirably adapted for dairy farming. Those who acquire them, and lay the foundation for future business, will, at the same time, be securing a bounteous provision for themselves and the children who succeed them. As representatives of one of the greatest interests of the country, I most heartily wish you success, and hope that we may all live to see the day when the conventions of the Mississippi Valley Dairy Association will consist of ten times as many delegates, representing a hundred fold increase in the amount of business.

Mr. J. A. Piersol, of Monroe City, Mo.—I wish to say a few words on a subject of great interest that has been passed over in the consideration of other matters. It is the practical working of creameries. The Board of Directors of my creamery sent me here to learn what I could. I would like to get the talk turned in that direction. The creamery system seems to be the plan and system of the future; there are some 40 or 50 in this State; our creamery was started May 1st. During the summer months I was gone, but came back in September; we found a great deal of difficulty in getting some one to take charge of it. In establishing creameries the outfitting firms will furnish butter makers for $60 and $70 a month and a manager at $5 a day; after a while these men will leave and you get cheaper men, only to get into difficulties. Our butter maker left after establishing a good grade of butter, and men employed subsequently did not do so well. We find it difficult to guage cream to know what its butter producing quality are.

Mr. Campbell—It is impossible to learn the creamery trade here. If the gentleman has no one about him able to run his establishment he should send some one to a successful creamery to learn. These men must go to a school of creameries and learn, then they will be able to teach.

Mr. J. H. Wanzer, of Chicago, Ill., was then introduced by President Colman, and he read the following essay:

COLLECTING CREAM VS. WHOLE MILK.

The system of cream gathering, or what is termed the Fair-

lamb system, is comparatively new, and all of its benefits have not yet been brought out, and we feel at a disadvantage when comparing it with other forms of association dairying better established. As yet, this form of dairying has shown to better advantage in the newer and more sparsely settled portions of the West, where stock-raising has been one of the points considered by the farmer. So well has it worked in the new dairy districts that the older ones are looking it up, inasmuch as it offers better opportunities for diversified farming. This plan is showing us how to get more good butter with less skimmed cheese.

There has been enough already developed in this new departure to convince the most skeptical that better and more butter can be made than in the old way. When compared with the old system the results are simply grand; taking, as it does, the cream from the farmer's door, releasing him from the labor of making the butter, as well as the expense of bringing about him those expensive conveniences requisite for the manufacture of even a fair quality of butter, always paying him as much for the cream that it takes to make a pound of butter as his butter would fetch after he had made it at home, and paying cash instead of store pay. The manufacturer, with his improved appliances for gathering, churning and working, converts the cream into an article demanded by the best home, as well as foreign trade, virtually bringing the most obscure farmer of the distant west, with his two or three cows, right into competition with his more favored neighbors that may chance to live near the great dairy centres of Elgin, or Herkimer, and instead of having to rely upon a home trade on account of the low grade of his butter, can have the whole world for his customers. Now at this age of dairying it would be folly to institute a comparison between the new and the old way, unless we can show money and advantages upon one side or the other, for there is no argument among men so good as the almighty dollar, and our 25 years' experience in dealing with dairymen leads us to believe that they are no exceptions to the rule. In my comparison of the two systems will try and show where the dollar comes in. First, we say to the farmer that has no taste for diversified farming and wants an excuse to go to town or factory every morning, that some of the items entering into our calculations will count for naught, but to the man who would make the most of his time and milk there are advantages in the Fairlamb system that are worthy your consideration. The creamery sends its wagon to your door after your cream, paying at least as much for it as you could get for the butter, were you to make and market it yourself, and with the new appliances for gathering cream, enable you to get one-eighth more cream than in the old and ordinary way of setting your milk. For instance, the dairyman that is making eight pounds of butter per day would have an increase of 365 pounds in the year, at 20 cents per pound would amount to $75, besides being relieved of the labor of making the

butter or even skimming the milk. Now in comparing this with the old and better established method of association dairying, we may have a more difficult task to show the dollar upon the side of the Fairlamb system, and as this convention wants facts and nothing else, we will make the comparison, drawing from our own experience in both branches of co-operative dairying, and from the experience of others. Now, the milk producer that is selling his milk or sending it to a factory for the six winter months, has sold it for, or expects about $1.30 per hundred pounds; this is about what he will get if we base the price upon the values that have ruled for creamery butter and skimmed milk cheese after deducting manufacturing and marketing expenses.

Now let us see what this farmer would have done had he sold cream instead of the milk. First, he would have gotten four and one-half gauges of cream, equal to 4 1-2 pounds of butter per 100 pounds of milk, which would have brought him 25 cents per gauge, $1.12 1-2, add to this the value of the skimmed milk, 25 cents, and we have $1,37 1-2, now add the saving of 10c. per 100 pounds for carrying to the creamery, and we have $1.47 1-2 against $1.30, a difference of 17 1-2 cents per hundred pounds in favor of the Fairlamb plan. Now I think there will be no difference of opinion in the items above, except it may be in the matters of carrying milk to a creamery and the value of the skimmed milk. In the item of transporting milk to a creamery the average distance, the farmers of Kane and McHenry counties, Ills., think it can't be done for less than 10 cents per 100 pounds. In the matter of placing the value of skim milk, I draw my conclusions from my own experience as well as that of others. Many dairymen of Central and Northern Illinois, Southern Wisconsin and Iowa, place the value of 100 pounds of skimmed milk at 25 cents; more will tell you that they had as leave have 100 lbs. of skimmed milk as a bushel of corn to feed; not to feed alone, but, as one of the Illinois farmers put it, he said: "If I had 20 hogs to fatten and 100 bushels of corn to feed them, I should make money by exchanging 20 bushels of the corn for 2,000 lbs. of skimmed milk, and feed them the 80 bushels of corn with the 2,000 lbs. of skimmed milk. I am sure I would make more pork and in less time than I could to have fed the 100 bushels of corn alone." Another said, "I am milking 15 cows and raising 12 of my best calves. I take about two-thirds of my skimmed milk and add a little oatmeal and grain, and raise calves that make as good yearlings as my neighbors, who let their calves suck the cow, the other one-third of my milk I feed to six brood sows, with an average of six pigs each, and by thus using my skimmed milk, I think it worth 30c. per 100 lbs."

My own experience leads me to place the value of 25c. per 100 pounds upon skimmed milk.

It will be conceded by all that in order to give calves and pigs a fair start in life they must have milk. These calculations would place the dollar upon the Fairlamb side.

These conclusions anticipate good management in all of the gathered cream plan, and so does it need careful management in the butter and cheese factory to bring $1.30 per 100 lbs. for milk in the six winter months. Notwithstanding, the fact that the Fairlamb system is new, there are already 1,300 in operation in the west alone, and if the commercial reports are consulted, it will be found that no other business in our country has made so wonderful a development with so few failures. Some of us can go back to the early success and failures in inaugerating and perfecting the systems whereby an article of butter and cheese could be made in the west that might be accepted in the markets of the world; and thank God, some of us have lived to see the blush mount the cheek of those that so confidently predicted our failure. Then we looked to the east for guidance. Now they come to us for advice. So we would say to those that look with distrust upon this new departure, hold, before you pass judgment, for before you are aware of it, your neighbor will have passed you on the road to success, as many of us who helped to bear the burden of opening up the west to successful dairying, have seen others left far in the background, because to lend encouragement to us in that early day was in some way to conflict with the prejudices brought from the east. It is a matter of fact that wherever the Fairlamb system has come in competition with other forms of dairying and has failed, the causes have been traced directly to mismanagement. Of the 1,300 creameries in the west, 90 per cent. of them are pronounced successes. Good butter can and must be made upon the gathered cream plan.

We need a greater diversity in farming. The milking alone as practiced in our large dairy districts seems to narrow down the chances of profits. Whilst the raising of stock and other farming pursuits that can be practiced with cream gathering would not only increase the chances of gain, but put the farmers' boys in a way to become acquainted with more than agricultural pursuit, with a tendency to enlarge instead of narrowing down the mind.

Besides the Fairlamb system would give each dairyman the opportunity of raising their own cows, instead of filling up the waste by going out among those that follow this form of dairying and taking up with the culls of the herds; the tendency of other forms of associated dairying being to lower instead of elevating the standard of milking herds. There is no longer a shadow of doubt but that the finest goods are being turned out of gathered cream creameries.

To be sure the rapid development of this form of butter-making has necessitated the employment in many cases of unskilled operators, caused by the fact that creameries have been built faster than we could educate men to work them, and which should not be charged up to the system. We honestly believe that the gathered cream plan is yet to revolutionize the manufacture of butter in the United States, if not the whole world. Joseph Sampson says that the gathered cream plan is to the west what Robert Fulton's in-

vention was to navigation in the east. We predict that within ten years, four pounds out of every five of butter made, will be manufactured upon this plan. We confidently expect this system to go on in its triumphant march, and some of us, now advanced in life, will live to find it as strange to find a milk pan or churn in the farmer's home as it is now a spinning wheel or loom.

Mr. Hiram Smith, of Sheboygan, Wisconsin—I wish to ask a question regarding the different manners of gathering cream. Mr. Curtis stated that the difference was from 8 to 24 ounces. If the milk is kept at the same temperature and under the same conditions, the gauge will be the same. Breed is nothing—the difference is in handling the cream. We must let the cream stand 24 hours in the Darlington creamery; but where they have wells, it takes longer. We have introduced the test system for cream. Before I went there, there was much mismanagement on the route; the milk supplied was in some cases condensed, and in others was too thin. Set the milk under the same conditions, and handle it in the same manner, and the product will be the same. If milk is cooled to 60 degrees you will have the maximum of cream; but if the milk gets warmer the cream will decrease.

Query (of the essayist)—What are some of the troubles in the way of the new creameries? Where are they going to make mistakes? Is it better for the route man to do the skimming?

Ans.—Yes, except under this test plan, when we judge the value of the cream, and cover the route every other way. If a farmer knows that he has to have a better quality of cream, he would be more careful of it; but it is better to have the route men do the skimming?

Query—Do you have any trouble with shortages?

Ans.—Yes, but it is possible to make a farmer honest with you.

Query—Have you much trouble in getting the full quantity of butter from the cream, in accordance with the gauge?

Ans.—Yes, from the schoolmasters of the business.

A discussion here ensued between Mr. Addy and Mr. Wanzer, as to the value of the test system. Mr. Addy defended the Schock and Bolander test, while Mr. Wanzer maintained that the test system is often a detriment.

Mr. Drury—I have endeavored to improve my method of making butter, and have tried to ascertain what manners were in vogue elsewhere. I sent a bright young man I had raised to Iowa, that he might learn there what they were doing; since his return we have been experimenting a good deal, and I have found it pays to have some one who has a knowledge of the subject. I think there is a great deal in feeding, and in the handling of the milk, that produces the butter. Out of 3 lbs. of cream, at one time, I made 1 lb. of butter; at another, I found it took 4 lbs. of cream to 1 lb. of butter.

Mr. Curtis—I have talked much to you during this session, but I want to say this: cream gathering is a pioneer system, and does not equal gathering the milk. I think it pays better to gather the milk, and make skim-milk cheese in addition to making butter—there is more money in this system.

Mr. Addy—We must deal with things as we find them. It is well enough to have theories; but the milk-gathering system is not the one for the West. It will do for the older parts of the country. Farmers will manipulate the cream, and the dairymen, who make butter from their cream, find it is short. I would say to those who intend to go into the creamery business: you had better start right, and after a while you will be O. K. The test system is the best; if it takes time and trouble, take that time and trouble. A creamery is not a national bank. When every one of your farmers knows that you will be able to find out his thefts, then he will be honest with you. I would not start a creamery without using the test system.

When asked to explain, he said:

Every farmer is allowed to skim his own milk, and every cream gatherer takes in his wagon 2-quart jars, and whenever he purchases cream, he takes a jar full of that cream and seals it, attaching thereto the name of the person from whom he buys. This jar, so marked, is set in a box in the wagon, and when the cream gatherer returns to the factory these tests are cured just as the cream is cured, and are put into receptacles large enough to contain them. These receptacles are placed in a churning rack, and the cream is churned; the butter is then removed and weighed. I have found, where it should have been 8 ounces, the variations have been 4, 6, 10 and 12, in tests placed in the same rack. These differences are caused by the different conditions surrounding, the keeping of the cream and skimming. Is it right that a man pay $1 for 50c worth of cream? And is it not right to adopt a system that detects such fraud? When the cream is brought to the creamery, and tested, we charge any loss to the farmer from whom it was purchased; he comes and kicks; is advised to take better care of his cream—does so, and finds that it pays.

Mr. Wanzer—There is no justice in the system, unless we test every day. The cream, to-day, may be good, and, to-morrow, bad; and it is often true, that where we mix cream from one dairy with another, it becomes so acid in the mixture that it will deteriorate.

The mid-day hour having arrived, the meeting adjourned to meet again at two o'clock.

AFTERNOON SESSION, JANUARY 31.

President Colman announced that Dr. Louis Bauer, Dean of the College of Physicians and Surgeons, St. Louis, who was to deliver an address on "Milk as a Diet," was unable to appear.

[But since the meeting, the Doctor has contributed the essay, which is here presented:]

ADDRESS BY LOUIS BAUER, M. D., M. R. C. S. ENGL.

Mr. President and Gentlemen:

At the earnest request of your Secretary, I am here to speak before you on the subject of "Milk as an Article of Diet;" and as I have, for years, taken a very lively interest in the subject, I enter upon the theme with pleasure.

I am partial towards milk. I like it as a beverage and as a food; I have freely partaken of it all my life, and have commended it to my patients in suitable conditions. Therefore, I am *full* of the subject, and feel strongly inclined to offer a few modest opinions upon it. Before, however, I plunge into *rem*, I beg to state that I have never experienced any biliousness from the free imbibation of milk, nor has my shadow grown less under its use. If it has acted as a poison upon my constitution, it has done so in a most insidious manner, for I have never been able to realize the fact. Intemperance in milk has, in my case, proved very harmless.

To speak seriously, I truly believe that there is no nutriment equal to milk. It is not only most palatable and refreshing, but it is readily digested, quickly assimilated, and rapidly converted into all the living tissues of which the human body is composed. At the same time, it agrees with both sexes and every age. During infancy, it is indispensable as an article of food, and admits of no substitute. It doubles the weight of the infant during the first months of life, and endows the same with a rotund, fresh, rosy and healthy appearance, for which there is no parallel example in favor of any other article of nutriment.

An average good milk should possess a specific gravity of 1030, and contain, in about 20 ounces, 350 grains of casein, 324 grains of fat, 421 grains of lactine or milk sugar, and 66 grains of milk salts.

The specific gravity will, however, lessen with the temperature of the milk, so that at about 100 degrees F., it will exhibit but 1024. When exposed to air, the milk at all times absorbs oxygen and expels carbonic acid. The latter is formed at the expense of its organic constituents, probably of casein, and new elements, richer in carbon and hydrogen, result. The changes thus effected in the compostion of

milk are rather slow and insignificant in low temperature; but rapid and destructive when the thermometer is high. Then lactic acid is formed, and the milk congeals. The chemical reaction of milk should be neutral or feebly acid or alkaline. A marked acid reaction indicates its decomposition. As a matter of course, the composition of cows' milk varies with food; with the number of her pregnancies, with the age of the calf, and the race.

Thus, for instance, beet and carrot augments the sugar; in the first pregnancy the qnantity of milk is less than in the following ones, and, therefore, more concentrated. Soon after the calving the milk exhibits a quantity of colostrum, which gradually disappears from the milk with time. Some races, as for instance, the Aldernays, return more butter, and the long horns more casein. The last portion of the milk given in milking is, according to Haskell, richer in cream.

This emphatic estimate applies exclusively to fresh, good and pure milk—milk derived from healthy cows, preserved in clean vessels, in dry and well-aired rooms, and speedily distributed to the consumer. There is no organic liquid in existence which is so readily depreciated, decomposed, or rendered more obnoxious to health.

Although we have the assurance that temporary ailment of cows does not materially alter the normal composition of milk, and that the seed of disease is not readily communicated to the consumers, there are sufficient facts of doubt on record to invalidate such statements.

That cholera-like attacks, varied affections of the mouth of children, and even fevers, have been traced to the consume of a certain milk, cannot be any longer denied. But, thus far, no absolute proofs have been furnished by reliable methods of investigation. The intermixture of milk, with purulent material from the udder of cows, favors an early decomposition, and the peculiar forms of mouth disease, particularly in children, known by the popular name of "soors." Changes of milk are likewise noted from the differences of food, and the so-called "troubles" have been ascribed to Rhus toxicodendron, upon which cows have fed. That the milk may convey the poisons of typhoid and scarlet fever, when the cows, or the milk, have been watered with foul creek water, is at least probable.

The milk from pregnant cows has proven objectionable for dietetic purposes, notwithstanding that microscope and chemical analysis had failed to reveal any morbid admixture.

Stable feeding is certainly objectionable, in reference to milk, even if the stables are well aerated and kept moderately clean. The best milk is always derived from roaming cows, both in reference to the benefit of better air and food.

As there are women whose milk does not agree with their suckling offspring, so are cows whose milk is rejected by infants.

In such case, there is no other remedy than to change the mother's breast to that of a wet nurse.

For adults, an exclusively milk diet is not unfrequently prescribed. For a man who has to perform a large amount of manual labor, milk, alone, may furnish all the nutriment required by the system; but in order to do so a very large amount of the liquid is necessary. At least nine pints must be imbibed during the twenty-four hours—an inordinate amount, as you may suppose, for the requirements of man. A partial condensation of milk, in order to rid it of the unnecessary fluid, would seem the rational method of making a diet exclusively composed of this material all that could be desired.

The ordinary forms of condensed milk are objectionable, because of the invariable admixture of sugar to increase its keeping qualities. This addition is objectionable for many reasons. The addition of sugar lessens its capacity for rapid digestion, and does not add to its keeping qualities. The simple exclusion of air, after it has been subjected to a high temperature for a sufficient length of time, insures its remaining unchanged for an indefinite period. Here is a field, in my estimation, which, when cultivated properly, will yield large returns.

To practical dairymen, I need hardly say anything on the importance of cleanliness in the handling of milk. But there are sources of uncleanliness, which are visible to the physician, but which would be overlooked by non-professional men until their attention is properly directed. I refer to the contamination of the water-supply furnished stock, and that used in the cleansing of utensils, by the seepage from privy-vaults. If the cows are permitted to drink water that has thus been contaminated, the milk becomes a source of danger to whoever consumes it. This is especially true, if the excrete of persons sick with typhoid fever are contained in the contaminating liquids. But if it is of great importance that cows should have pure water to drink, it is of still greater moment that no suspicion should attach to that used for washing the utensils employed about the dairy. Over fifty epidemics of typhoid fever have already been traced to this source.

The poison of scarlatina has been spread through the medium of milk, in a large number of instances. About twenty such epidemics have been already proven to have thus arisen. The poison of this disease is volatile, and readily absorbed by milk, when it remains in the presence of a person sick with it; besides, it is present in the scales of skin, which is always shed from the whole surface of the body during recovery from an attack. Persons recently ill with scarlet fever should have nothing whatsoever to do with milking cows, or the handling of any of the products of the dairy.

A number of epidemics of diphtheria have already been traced to the milk supply of the families in which the affection has appeared. Many more, undoubtedly, have had the same origin.

You see, gentlemen, to how great an extent you hold the health and the lives of the people in your hands. Without your aid the physician would often find himself shorn of his strength to battle with disease. Yours is a high and precious trust, and I am glad to find you organizing for the more perfect discharge of the duties you have undertaken. Scientific investigation cannot fail to enlarge the area of your usefulness, and, at the same time, add to the legitimate profits of your chosen field of industry.

I have no doubt as to the success of your enterprise. To-day marks an era in the development of one of the commanding interests of this great Valley, an interest which has been too long neglected. I compliment you for the energy and enthusiasm which has been evidenced by this large and intelligent gathering, at the initial meeting of your Association, and cannot help predicting for it a very brilliant future.

Mr. Charles Cabanne was then introduced, and read an essay on

WHAT IS THE BEST METHOD OF SUPPLYING LARGE CITIES WITH MILK?

I was requested, late yesterday afternoon, to write an article on this subject, and as this is the first address I have ever written, and the first address that I have ever delivered to an assembly, I hope you will make allowances.

I will confine my remarks more particularly to the supply of St. Louis, as I am more acquainted with the conditions here. Nearly all of the milk sold in St. Louis is produced from cows in this city, or within a mile of its limits. The milk from these cows can be sold cheaper in this city than the milk produced upon farms so far from the city that the milk has to be shipped in by rail. To give you some idea of how small a quantity of milk is shipped into St. Louis every day, as compared with Chicago and New York City, it is only necessary to say that about 2,500 gallons comes into St. Louis, while Chicago receives about 40,000, and New York 110,000 gallons.

A large quantity of the milk produced in the districts from which Chicago and New York draw their supplies, is manufactured into cheese and butter, besides what is shipped into those cities every day; so that the supply is always in excess of the demand, so that it is only necessary for the deliverer of milk, in those cities, to adopt such methods as will enable them to force parties from whom he buys, to ship milk and cream of a certain standard. But here in St. Louis, the conditions are entirely changed, and the question of delivering pure milk becomes more complex. There is no continued surplus in the districts from which St. Louis draws her supply of country milk worked into cheese and butter; and to give the consumer what he wants when the supply is short, to simplify matters, the hydrant is called into use.

It frequently happens that there is an increased demand from the same number of customers, just at a time when any given number of cows, from a change in temperature, or feed, fall off in their milk. In order to meet this condition, it is necessary to carry a reserve at some point, where the deliverer should have a creamery, where the surplus, whatever it may be, is manufactured into cheese and butter. The reserve must always be kept in proportion to the volume of milk sold. So far as my experience goes, depending upon shippers, where they are required to regulate the supply, has been a lamentable failure.

The first thing for a company, wishing to supply a large city with wholesome as well as pure milk, is, to buy milk from farmers who live at such a distance from the city that it will not pay them to feed their cows with the refuse from distilleries; but, on the contrary, where hay, corn, oats, bran and pasture, are the cheapest food. This is the opinion of many, notwithstanding that our Board of Health here decided that swill was a proper food for milk cows.

The best way to meet the wants of a farming community, from which such a company propose to draw their supply, is to build a creamery on the railroad, where they must deliver their milk twice a day, when required, where it should be prepared for the market. The next thing, which is very difficult for the deliverer of milk to do, is to prevent the adulteration of milk by those from whom it is bought, or by employes of the company, after the milk is received from the farmers; and if the milk or cream is adulterated, to locate the point at which the adulteration takes place, whether it is on the farm, in the milk depot, on the delivery wagons, or in the house of the consumer. To do this, it is necessary to have a perfectly equipped laboratory, controlled by competent chemists.

Parties unfamiliar with the details of a city milk business, can form no idea of the constant increasing and skillful work required by this department of a milk business. Samples of milk must be taken when the milk arrives, samples must be taken from the delivery wagon, and samples must be taken from the houses of customers, by reliable assistants, and brought to the laboratory for examination and analysis. I am familiar with the ordinary methods of detecting adulteration, and I know that they are almost useless, and frequently lead to unjust treatment of the deliverer of milk; but a control, based upon such a foundation as I have above stated, is scientific, and an analysis of milk, which is to be distributed in its natural state, is the only true method of ascertaining its food value.

The St. Louis Dairy Company of this city was organized to perfect the above scheme, and if they do not succeed in obtaining the patronage of its citizens it will not be from any fault of the scheme, but it will simply be because I am not the right man to show them the merits of the undertaking.

I am perfectly well aware that this is an exceedingly elaborate, and at the same time, necessarily, costly system; but it is absolutely

indispensable for insuring the supply of milk, that can be implicitly trusted. Many people ridicule, as absurd, the notion of a chemical laboratory as a necessary adjunct to a milk business; but, I assure you, I would as quickly, now, dispense with the services of our book-keeper as with our laboratory, and it has been but eight months in operation. I now know how badly I was imposed upon before our laboratory was equipped.

I wish what I am now about to say could be heard by every consumer of milk in this city. We have analyzed samples of milk, sold by deliverers of milk here as pure unskimmed milk, that contained but 10 per cent. of solids, while it should have contained not less than 12½, and might have contained 14½ per cent. of solids. An average of 13½ per cent. of solids can reasonably be demanded by the buyer in this market, during this winter. Now, the moneyed difference between milk containing 10 per cent. and 13½ per cent. in solids, is over 27 per cent.

I quote the following letter from a London chemist:

"31 ST. PETERSBURGH PLACE, BAYSWATER, W.
LONDON, December 15, 1881.

There is not time to re-write. I would just add that the standard of quality of milk, fixed by the Society of Public Analysts, is 11.5 per cent. of solids, viz: 2.5 per cent. solid fat and 9.0 per cent. "solid not fat." Public Inspectors can take a sample anywhere and at any time, and if such sample is found, on analysis, to contain than 11.5 per cent., the vendor is prosecuted and fined. It will, therefore, give you some idea of the control we exercise, when I tell you that last year the actual value of the milk we supplied to the public exceeded the public analyst's standard by £5,760—$28,800—or equal to an additional dividend on our stock of 4 per cent. We paid 10 per cent.

I am, gentlemen, yours faithfully,
G. MANDER ALLENDER."

To the farmer who supplies such a company with milk, the laboratory is simply invaluable, as it not only shows the true value of the milk he delivers, but represents to the public the necessity of paying him a just return for his capital and skill, at times when the market is being flooded by deliverers without established reputations, at prices below the cost of production.

The President then called on Mr. T. C. Campbell, of Manchester, Mo., to read an essay contributed by Mr. J. B. Brown, President of the New York Plow Co., entitled:

ENSILAGE.

The one commodity which has never yet been overproduced or underconsumed is *good butter*. Three-fourths of the people of this country have never tasted it. It is not to be found in either of the great retail markets of the city of New York, Washington and

Fulton, and the restaurants where it is served are very few in number and known only to the initiated resident or wealthy visitor. It is almost a misfortune to have acquired the habit of using fine butter, since it is a taste that must often be shocked, but it is a tempting field for those manufacturers who have the capital and the skill. It requires a combination of the best milk producing food, the creamiest cows and the well equipped and well managed factory.

The milking should be done by women, as in the Channel Islands. The natural sympathy of sex has a soothing effect upon the animals, and women's hands are better adapted by their softness and cleanliness for the extraction of the milk.

But a home is not the proper place, and women who are interested and occupied in the care and various duties of the family are not the persons to produce the best butter. There is one point, however, in which the dairy butter excels the creamery butter. It is easier for the housewife to cut out the layers. If the creamery too, was divided by sheets of white paper into horizontal layers it would do away with this little objection. The largest eastern breeders of fine cattle say that the best stock of cattle is being bought by the farmers of the Mississippi Valley. I have never seen this part of our country, but I presume that it is liable to interruptions in the supply of green fodder by drought and frost, that everywhere there is need of reservoirs of food—*milk exciting food.* It has always heretofore been considered in the Eastern States to be poor farming to sell hay and straw instead of consuming it on the farm, thereby increasing the manure supply, and a poor calculator who has his cows come in during the winter season. The discovery of the method of keeping green fodder in a *green state* by the *system of ensilage*, which is now in its *eleventh* year in France and *eight years* old in this country, has reversed these rules. It has made the hay crop a surplus product of the farm, and provides a food whereby the winter butter can be made as *cheaply* as the *summer butter.* It has doubled the value of the corn plant, and made of farming a surer and more attractive occupation than before.

The cost of a silo is entirely in the power of the farmer. A trench, *tumulus*, or hole-in-the-ground silo will make just as good ensilage as the more expensive concrete or masonery silos. Safe from frost, fire, vermin, growing in fertile soil to enormous weight, maize ensilage is the cheapest crop to produce and harvest. The days of doubt and of experiment are past, and those farmers who still prefer to depend upon dry fodder from their meadows and stacks, and upon the uncertain root crops for their winter cattle food are more conservative than economical, more cautious than prudent, and are resisting through ignorance and *inertia*, the greatest blessing that has ever befallen the world, adding to its capacity to support life at least *ten fold*, and bringing the possibility of a comfortable supply of animal food to all its inhabitants.

If the farmers of the Mississippi Valley have any lingering doubt as to the healthfulness of maize ensilage, or as to its effect upon the product of the dairy, they will dismiss them forever when they come to visit any of the fine farms in the east, that are run upon that principle.

Cattle costing $10,000 to $20,000 each, are fed upon it at Loeser's farm, and some of the finest Jersey cattle in America at Theodore Haremeyer's farm, (both in New Jersey) where the very finest butter is also produced.

Cattle can be fattened upon maize ensilage without any grain, as may be seen at the farm of W. H. Gilbert, of Richland, N. Y., whose butter is delicious, and whose herd, after three years of ensilage feeding, are as healthy and high spirited as any in America.

Dr. Pratt, the famous Holstein breeder of Illinois, says, Jan. 2nd, 1884: "I am too busy to answer the questions that any article on ensilage would call out, but, I am using ensilage now for the fourth year from my ground silo, and though I have seen a great many silos, I have yet to find one where the ensilage is as sweet and green as mine. Anyone who can dig a hole in the ground 5 or 6 feet deep, fill it with fine cut feed and cover it with a foot of earth, will get as good ensilage from it as though he spent $1,000 to build one. There is also, less trouble in taking it out and no more loss."

The farm of Francis Morris, of Maryland, (Ellicott City,) is the real Mecca of the American ensiloer, and Mr. Morris is the true prophet. There he can see the first practical silos made in this country, now seven years old, eight times filled with more than 800 tons of fine cut maize and clover. These trenches cost only a few days labor of oxen and scraper, and can be used year after year.

In 1880 there were five silos only in the United States; now in New Jersey, Pennsylvania and New England, there are several hundred; and thousands will be built the coming year.

It is the salvation of New England, where the abandonment of farms has been going on for some years, and the cheaper living foreigner taking the place of the Puritan settlers and their descendents.

The Mississippi Valley is not without its testimony. Here is a letter from Sedalia, Mo., Jan. 3rd, 1884, from a farmer who ensilaged last spring several hundred tons of fine cut rye, he says: "I built a second silo this past fall 80 feet long, 16 feet wide, and 24 feet deep—divided into five sections. I filled four sections with soured corn, and one with second crop clover. I have been feeding corn ensilage since the 4th of November, and I find it a grand food for milch cows and mules. I am feeding 120 milch cows and 112 mules on this food. My horses, mules and working cattle I feed on clover ensilage. My silos kept splendidly, only a little on top was damaged. I cut all my ensilage with a cutter."

J. R. BARRETT.

When the farmers of this great valley, blest with a fertile soil that makes production cheap, shall have realized the value of this system and shall have provided the animals and the factories proportioned to their vast acreage, the days of suet butter and lard butter will be short. Oleomargarine came as a welcome relief from the nursery of rancid, greasy butter, to which those of moderate income had to confine themselves. Useful and valuable it has been, but it leaves a tallowy flavor in the mouth, and it must go. The great discovery of Auguste Goffart, of France, comes to us to give us forever more the fragrance of June butter, and its delicious rosy, healthful taste. We will use less lard too, and our fried food as well as our broiled, will be more digestible.

It is a well known fact that frosted stalks which cattle will not eat are so improved by a sojourn in the silo that they are eaten with avidity in less than 30 days from the field. Stalks from which corn is husked are greatly improved by being cut fine and put under continuous pressure in a silo.

If the silo had been patented and promulgated with the interest and energy that has attached to barbed wire and driven wells, they would have now been as capacious as our barns. But Mr. Goffart gave it to the world, and it will not be long before it will pass over the jealousy of the scientists and bless every family in the land, a physical Passover, an escape from misery.

Ensilage is an additional argument in favor of free trade. With our tropical sunshine and invigorating waters, and the system of ensilage reservoirs enabling us to pour forth a continuous supply of the best butter, cheese, meat and leather, we can preserve the balance of trade without any tariff. Its effects upon immigration will soon be immense. As much greater as the corn plant is than meadow grass, so will the capacity of this country to support life be greater than the acres of Europe. Where they have the sunshine they haven't got the soil, and where they have the soil they haven't got the sunshine. In England, however, the silo has been found to cover the evils of wet weather and the British farmer will be able to secure more of his meadow grasses than ever before.

Mr. John Y. Sawyer, of Godfrey, Ill., was then introduced by President Colman, and he spoke as follows:

Upon request of Mr. Sheppard, Secretary of the "Mississippi Valley Dairy and Creamery Association," I will relate my experience, and endeavor to help those in need of such information.

Will say, to begin with, that I never saw a silo until I built mine; never saw a concrete wall put up until I went at it, and had never seen ensilage until I opened my silo. I have made a few mistakes, and will relate them, so they can be avoided by others. 1. The roof of my silo leaked, and wherever the water got in it rotted. 2. I did not have weight enough; should have at least 150 lbs.

to the square foot of surface. 3. The walls of my silo were not as smooth as they should have been.

The silo was built on a steep side hill, so as to have good drainage, and be more convenient in filling, as well as feeding my cows; have the cow stable at the foot of the hill, only a little above the bottom of the silo.

I commenced by building a shed 32 feet long by 14 feet wide, early in the spring, and worked rainy days and other times when not occupied with farm work, thus lessening the cost very materially. Inside this shed I made an excavation 24 feet long by 12 feet wide and 10 feet deep. I then took a scantling 12 feet long, 2 by 6 inches, set one end in the ground 14 inches from the bank, with edge of scantling toward the bank, careful to get it perpendicular; then nail fast to the shed. I used two of these on each side, and three on each end. Next get a plank, 2 by 12 inches, 22 feet long, for each side, and one 9 feet 8 inches long for each end; let the side plank reach by the end plank the thickness of the same; the end plank will then hold the side plank in place. Thus I have a cavity of one foot thick all around the silo. The concrete is made by putting four parts of sand to one of Louisville cement; mix dry in a mortar box; then wet and mix again; add five parts of coarse gravel; mix thorougly and fill the cavity. If stone is plentiful, you can put them in the middle of the wall, being careful not to let them come to the edge of the wall; the concrete will set in one day, so the board can be raised 10 inches, leaving a lap of 2 inches, and proceed as before. After reaching the level of the ground, scantling and plank can be put up as on the inside. The floor is made of 1 part cement to 4 of sand and gravel. I used 2½ bbls. of cement at $1.50 per bbl.; the lumber cost $35.

I have nothing to sell. When I left home I expected to see something and hear something about the creamery interests. I advocate no patent rights—I sell no salt. My cows are the pictures of health. They are not hog fat; I do not want that. I feed 2 quarts of wheat bran and 40 pounds of ensilage twice a day, and with it a little hay. I planted the corn for my silo June 2. The "early yellow" and "large white" were the varieties planted. I prefer the white, as the stalks are larger. I commenced filling my silo August 27. The work occupied about five days, and about 35 tons were put in. The silo was 10 by 10 by 22 feet; the contents settled three feet, and it was weighted, with from 90 to 100 lbs. to the square foot. I will not stop short of 150 lbs. to the square foot next year. The silo was opened November 10, and I began to feed from 18 to 20 lbs per day to five cows. I weighed the milk for the following four days, and the result was—

First day, - - - - -	49 pounds.
Second day, - - - - -	54 "
Third day, - - - - -	55½ "
Fourth day, - - - - -	57 "

A few days later one milking weighed 30 lbs.; the butter was of a good golden color, and I made 25 lbs. per week, against 22 and 23 lbs. previously, while the cows were feeding on good pasture. I will make 25 lbs. this week. It is now 10 weeks since I commenced to feed.

The ensilage I made is said by experts to be of a very good quality, if somewhat more tart than it should be; and I have been told that additional pressure is advantageous. I cut straight down into the silo. Below three feet I found no mold; but there was a slight indication of mold above that level. The silo is made of concrete. In the cold snap the milk and cream froze, and I made less than 25 lbs. a week; before that, my butter had not varied a quarter of a pound a week. Since the cold weather I have regained the accustomed regularity.

Query—Did you get the same amount of butter from 60 lbs. of milk as from the 40 lbs. obtained before you fed ensilage?

Ans.—I was making from 22 to 23 lbs. of butter before I fed ensilage; afterwards I made 25 lbs. The increased flow of milk reached its maximum during the first two weeks. I do not think there is as much butter proportionately in the milk made on ensilage as on dry feed. There is an increase, you will note, of 3 lbs. of butter, while the milk increase is 20 lbs., or one-half. I put a roof on my silo. In Maryland, I understand, they cover it with earth. I shall improve it by putting a tighter roof on and more cement at the bottom. The butter made from this milk does not color so yellow as June butter, but the color is good. I had five acres of corn planted on ground that would not raise five tons of hay; it was clay ground. A cow will eat two tons of timothy hay in a winter; five tons will keep two and a half cows. I fed five cows and two calves, who ate one-third of the ensilage. I had three teams and five men employed five days to fill the silo. Thirty-five tons of ensilage will feed six cows six months. It is best to use the cycle cutter. We are building a silo 65 feet long and 25 feet wide.

Prof. Sanborn—Those who have taken up ensilage think it the greatest thing on earth; assertions have been made more rash than those of our friend. It has been found from reports made from 100 silos that they cost $3 per ton capacity. If one acre averages twenty tons, that acre costs you $60. The average value of farms is $20 per acre. In order to put in a silo, you must pay three times the value of your land; the interest on the cost would pay for dry feed. An ordinary farm will grow twenty tons of corn fodder where three tons of hay will grow. It has been agreed that $2 a ton is the cost of handling it, and an additional expense of $40 is added. Do these figures suggest that silos pay?

Mr. Sawyer—In regard to cost, Prof. Sanborn omits to mention the other feed used with hay. I had sent to me a copy of the report of the Agricultural Department at Washington, and I studied it very carefully; their experiments proved that silos were

not correct, and I have proved that they are. I will agree to furnish silos for less than $2 for each ton capacity. My silo cost $66.50, and will last a century; it is as solid as a stone wall. The most expensive are built in the East, where material costs more. I would be glad for you to visit me, every one of you, and see my silo. There is no money in it for me, but I want you to see my cows; they are not big ones, but they are healthy.

Mr. Hobson, of Illinois—I want to impress upon you the idea of the proper feed for milch cows. There are feeds better calculated to produce butter and milk than others; grass, in my region is the best, and produces a better flow of milk than any other food. All other feeds must give the palm to this. Dried hay cannot produce milk: nor dried bran and hay. There are two sides to the milk question: Will it pay, or will it not? I have never tried ensilage, but I think it is the thing, The milk is 87½ per cent. water, and where that water is to come from in feeding dry fodder I cannot say. To be sure, you may give the cow lots of water to drink, but I think it would be best to give it in the natural way, through the medium of the food.

Mr. Curtis—Truman A. Cole, of Syracuse, N. Y., has twenty cows, and the product of each cow is 300 lbs. of butter a year. He feeds dry orchard grass, cut early, and bran and oats.

The Hon. Hiram Smith, of Sheboygan Falls, was then introduced in complimentary language by President Colman, and he proceeded to read his address, as follows:

I am asked to say something "On the different systems employed in the treatment of milk and cream, in order to produce the best grade of butter." This subject will necessarily include the raising of cream, ripening the same, and churning and working the butter.

There are many different methods of separating cream from milk, but, strictly speaking, there is but one system, and that is the system of force. This should be thoroughly understood, as it will protect dairymen from imposition of inventors, who herald their devices as a new discovery, a new system, whereas it is only a different method of the same old system of force. Cream being lighter than milk, is the only reason why it can be separatad from it, the difference in specific gravity being so slight (I think only about three or four degrees), makes it quite difficult of separation by unskillful means, however elaborate.

The system now almost universally in use, to separate cream from milk, is the force of cold applied to milk, or to air or water surrounding the receptacle containing the milk. When we know, accurately, just what this cold application really performs, just what work it does, and always exactly the same work, whether in dog-days or December, we shall be better judges of the many devices, whether in the form of pans and cans, advertised for raising cream.

All can readily understand the practical working of the force of cold. In walking along a railroad track they will see that there is a vacant space between the ends of the rails. When the mercury stands at zero and below, the cold atmosphere has forced the rails into shorter length than they are in ordinary weather, and quite a good deal shorter than when the mercury stands at ninety above zero; in other words, the force of cold has condensed—contracted the rails into less dimensions.

Take another illustration, with which all farmers are familiar—a common wagon wheel; in dry weather, of course the wood work of the wheel shrinks some, but the chief difficulty is in very warm weather—the heat expands the tire; it is longer, and consequently loose, and we have been educated to pour water upon the wheel, to swell the wood work, and so tighten the tire. While it slowly does this, it at the same time does much more effective work in cooling the tire, and instantly contracting or shortening it; but of course the relief is only temporary.

These illustrations are only given to fix in your minds that cold contracts—and heat expands—many substances, among which is milk, as well as most metals. The whole secret and philosophy of surrounding milk with cold air or water, is that the force of cold contracts—condenses—all the ingredients of milk, except the fat or cream; these ingredients, becoming condensed, are heavier, and seek lower positions, displacing and sending up the lighter fat or cream, which is not affected by the cold, but retains its original dimensions, and floats more easily, as the balance of the milk becomes more condensed and heavy; therefore the rapidity of cooling determines the time of separation. If brought to near freezing point, it is done in forty minutes; if to 45 or 50 degrees, it is done perfectly between milkings.

If the milk is placed in cans eight inches in diameter, twenty inches high. holding about thirty-seven pounds, and placed in a covered tank, with spring water at 50 degrees, running through, or with well water and a bushel of broken ice to 300 lbs. of milk, the separation of the cream from the milk is positively secured in great perfection, regardless of the weather. This can be done in various ways, either by submerging the cans in ice water, or by placing cans in water as deep as the milk, in tank or pools, or in bureaus with ice over the cans, after the plan of cold store rooms.

Another method is to place blocks of ice in the bottom of cans or vats, confined with wire screens, and the milk immediately poured upon the ice; others with a tube in the centre of the can, to assist in cooling the milk.

There is also the large pan, within another pan, with cold water placed under and around the milk pan; but all these several methods are one system of rapidly cooling the milk by the force of cold, and each dairyman can find for himself which is the most convenient and economical, ice or water; they are all seeking the same end—of forcing the cream from the milk while it is yet sweet.

There is another method of separating the cream from milk, by the centrifugal machine, the same as syrup is forced from sugar, or honey from the comb. Although this does not use ice or water, yet it is done by the force of mechanical power; this latter method is the most expeditious way of converting milk into butter and skim cheese, now in use. At present it is quite expensive, but by improved machinery and competition, may eventually supercede all other methods.

You will see by the foregoing remarks, that the several devices are seeking, practically, the same end; and I have no hesitation in saying good butter can be, and is made, with all of them; and yet there are advantages and disadvantages, more or less, attached to them. In all open setting of milk, either in common milk pans or deep setters, in open pools, or the large pan within a pan, are all dangerously exposed to dust, flies, and any unpleasant odor that may be floating in the surrounding atmosphere. The cream being the coldest surface presented, condenses the atmosphere which is settled upon, or is attracted to it like drops of water upon an ice pitcher in a warm room.

When the weather was cold, clear and pure, I have made very good butter from these open setters; but when the weather was warm, muggy and impure, it required great diligence and experience to avoid losses greater than the profits; whereas, with covered setters, or submerged cans, all the danger of dust, flies, unpleasant odors and unfavorable weather, are positively avoided. But little experience is required; a thirty cent thermometer, placed in the panel of the tank, indicates the temperature, and if it is 45 or 50 degrees positive safety is secured between milkings. My experience teaches me to discard all devices or methods that require hand skimming; it is needless work, that nobody pays for, and nobody thanks for, or ought to, as the great army of over-worked women, with their ten or fifteen cent butter, can testify; besides, the cold, sweet milk, separated from the cream, in eight or ten hours, is much more valuable for feeding pigs, calves, or to work into skim cheese, than any open set milk, standing (as it has to) twenty-four or thirty-six hours, to secure the separation of the cream. The milk, meanwhile, in summer, approaches or reaches acidity, which greatly lessens its value for feeding purposes, and is ruined for making cheese.

The management of the cream is equally as important as the care of the milk; the cream from two milkings should always constitute one churning, and thoroughly incorporated together, frequently stirred and areated, so as to ripen it in twenty-four hours—this will be indicated by a slight acidity, not enough to materially thicken it. This point is best reached, in summer, by standing the cream in a cool, dry place; and, in winter, the cream should be warmed to 62 degrees, and kept in a warm room; and churned, in summer, at 58 degrees, and, in winter, at 62 to 64 degrees. A re-

volving churn, without inside fixtures, is preferred; coloring matter should be added to the cream, sufficient to color the butter to June color; a steady uniform motion of the churn, if the cream is in the right condition, should produce the butter in from thirty to forty-five minutes. As soon as the cream breaks, and the butter appears in granular form, the churning should stop, and the butter-milk be drawn off, and cold brine added sufficient to wash out all the butter-milk, while the butter is yet in granular form, looking much like wet wheat—when the butter should be taken on to the worker, and one ounce of fine salt to the pound of butter, evenly sifted upon it, and slightly worked into a solid mass. After standing two or three hours, where it will not become soft or very hard, it can be re-worked until somewhat dry, and packed and set in a refrigerator until it is solid, and then sent to market before it is a week old. Unless it is sent to a cold store-room, for winter use, by closely observing the above directions, an operator, with three days teaching, can make butter that will command the highest price in market, bringing contentment and profit to the dairyman, and satisfaction to the consumer.

At the conclusion of his essay, Mr. Smith referred to the packing of butter, remarking that it should be packed immediately, for if it remains long exposed there is a loss of aroma. Heat and exposure to the air will decrease the aroma of the best butter; and men are not willing to pay for that aroma when it is lost. The old idea that butter will be streaked if it does not stand over night is a fallacy; the best way to do is, immediately after taking it from the churn to beat it down in a cask and the next day work it over again. There is no mystery in the making of butter, though everyone seems to think there is; I could teach a man in three days to make just as good butter as if he were at it a year. Every portion and detail of the manufacture is written; with reading and observation there is no danger of failure, the process is philosophical. There is much in the temperature for setting, but all these facts can be obtained in writing.

Mr. Douglas—It is well known that most of those who make fine butter in Germany make it from sweet cream.

Mr. Smith—It is not saleable.

Mr. Douglas—I have been corresponding with a maker for some time who lives near Brookline, Mass., and who receives $1.25 a lb. for his butter; he says he churns sweet cream and salts it lightly. No one cares to pay enough for it here. The Brookline maker did not wash the butter, he worked it out and treated it with the extreme of carefulness. I have tried the plan and find that it makes better flavored butter, but they claim it will not keep. We do not want to keep it; there is sale for every pound of good butter that can be made. I know a Mr. Havermeyer who has 100 cows, and gets 75 cents a pound for his butter.

Mr. Sawyer—Yes, and he feeds ensilage, and has for three years.

Mr. Curtis—I find from a published report that my statement regarding the time for churning was misconstrued. It said that from 40° to 60° was the proper temperature, properly the temperature should not be below 54°, and 58° is the average.

The essay by John Stewart, of Anamosa, Ia., was then read by Mr. W. N. Tivy, it was as follows:

THE PROFITS OF THE CREAMERY VERSUS THE DAIRY.

Gentlemen of the Mississippi Valley dairy and Creamery Association: Regretting my inability to be present at your first meeting, I will contribute a few thoughts upon the subject assigned me by your secretary, and will condense my ideas in as few words as possible. The concentration of capital and associate effort has long been recognized as necessary in the accomplishment of large enterprises. Without the concentration of capital we would have no telegraph, railroads, canals nor bridges; and the list might be continued until you would get tired of hearing it. What is true of those large enterprises is true of smaller industries. It is in the recollection of many of us, when our clothing was made at home. The wool was carded by hand, then spun by the old spinning wheel, and there were few houses, especially in the country, where you would not find the *old loom*. Who would think now, that it is the part of economy to make our own clothing by hand? Now this dairy question is not an exception to this rule. One of the advantages of this creamery system of butter making is, that it is furnishing a finer article of butter than was ever produced by the private dairy. This is admitted by all who are conversant with the trade. The fact that it sells for twice as much as the average of the private dairy, leaves no room for extended argument on this point. I will endeavor to show briefly some of the reasons why the creamery, or co-operative system, should be generally adopted, especially here in the west, where the greater number of the farming communities have not the means to fix up properly for private dairying, as it requires the expenditure of from 500 to 700 dollars for buildings and fixtures, necessary to take care of the milk of thirty cows.

The subject assigned me, of the profits of the creamery system over the private dairy you will readily see, cannot be properly discussed without the use of figures. I am aware figures are not as interesting to present to an audience as something else, and I will indulge as sparingly as the subject will permit. To illustrate this subject more clearly, we will suppose twenty farmers decide to devote part of their attention to dairying. They have thirty cows each. They invest 500 dollars each, in buildings and fixtures. This foots up in the aggregate ten thousand dollars. Interest on this sum at western rates, would be one thousand dollars per annum. Add to this the repairs and replacement of worn out fixtures, and at the end of ten years, it foots up the snug sum of thirty thousand dollars.

Suppose these same men decide to go on in the co-operative plan. They invest two thousand dollars in buildings and fixtures. This sum is all that is necessary to take care of the milk from 600 cows. Interest on this sum would be $200 per annum. Add repairs, and in ten years it has grown to $6,000. Now at the end of ten years, the buildings have all depreciated 25 per cent. The private dairy buildings and fixtures are only worth $7,500. The creamery buildings and fixtures are now only worth $1,500. Depreciation in favor of the creamery, $2,000. Difference of interest and repairs, $16,000. Total, $18,000.

So much for the investment. The next thing we will notice is, the difference in the yield of butter per 100 lbs. of milk. The yield with the average dairymen is about one-third more in favor of the creamery. But we are supposing these twenty men to be reasonably well fixed for dairying. The yield, compared with such dairies, would average about one-half pound of butter to 100 lbs of milk, in favor of the creamery system. Suppose these 600 cows produce 7,500 lbs. butter. The creamery system would produce 84,725 lbs. Difference 9,725 lbs., at 25 cts. per lb., would be $2,431.25; for ten years, $24,312.50. Then add, say five cents per lb. difference in price, and we have $4,236.25, or, in ten years, $42,362.50. We will next compare the expense of manufacture: A private dairy of thirty cows will require one girl extra help at, say $2 per week; board, $2 per week—total, $208 per annum. This would make for the twenty dairymen $4,360 per annum. A creamery, with 600 cows, will require, say one superintendent, at $600; one assistant superintendent, $480; one light help, $360; one girl help, $208; hauling milk, $2 per cow, for season, $1,200—total, $2,848. Difference in favor of creamery per annum $1,512 in ten years. This sums up for the twenty dairymen, at the end of ten years, as follows: Gain for creamery over private dairy, in investment, $18,000; gain in yield, $25,312.50; gain in price of butter, $42,362.50; gain in expense of manufacture, $15,120—total gain in ten years, $99,795, or about $5,000 for each dairy.

Now I will compare, briefly, the average dairy, as they are run here in the West. The 600 cows, in an average dairy, would produce about 56,000 lbs., which, at 16 cents, would bring $8,960. The creamery system, with the same milk, would produce 84,725 lbs., which at 30 cents per lb., would bring $25,417.50. Difference in favor of the creamery, $16,457,50; for ten years, $164,575. As there is not generally much money invested in the buildings and fixtures of the average dairy, it would probably be abont the same in the aggregate as the creamery; but there would still be the gain in help, which, added to the above, we have, in ten years, the enormous sum of one hundred and seventy-nine thousand six hundred and ninety-five dollars ($179,695) in favor of the creamery system. I am aware there are persons who will question these figures, and will think them above the mark; but I am not guessing at these hings, and know them to be below rather than above.

If the above figures are correct, and one neighborhood within a radius of three miles is losing $179,695 every ten years, what is the loss to the whole country?

Mr. Addy—There is, in the market, what is known as imitation creamery butter. As it is commercially understood, this butter is composed of the fancy grades of unsalted stock, gathered from farmers. It comes from common centers, and is worked up and stamped. Farmers with from two to four cows make a little butter; a buyer purchases this, and the finest is selected; the salt is washed out with cold brine, and it is put together in a mass, mashed with men's hands, re-salted, and packed. The best of the leavings is put up, and is called Factory butter. Then the remainder is put up, and called No. 2 Factory butter. There is none of the bad quality of butter used. This Imitation Creamery is being adulterated to some extent, and also the Creamery butter. It will never do to allow Creamery butter to be adulterated. I have heard of men using from 10 to 15 per cent. of neutral oil. When Mr. Kilborne, of Elgin, failed, one of his largest items of assets was "neutral oil." I asked one of his creditors what it was for? To put in the cheese, he said.

ESSAY BY G. E. WETZEL, ON THE MANUFACTURE OF BUTTER.

Mr. President and Gentlemen of the Convention:

It has been but a short time ago that the manufacture of butter in our section was in its incipiency, that product making its appearance in our market in very small quantities, such as small tubs, pails, caddies, etc.

At that time, the dealer's occupation was very small, grocers and dealers buying very limited, in a small, peddling way. Look at the large change in affairs; they now buy by tens and twenty tubs—even more, at times—and the butter commission merchant's occupation has become a pleasant and profitable one, which is largely attributed to the fact that conventions like these have been held all through the country, disseminating knowledge and enlightening persons concerned in all matters pertaining to the dairy and its products.

You have all, collectively and individually, like myself, informed patrons, not only of the requirements of our market, but instructed them in the manufacture of the finest grades that can be produced from the dairy.

I wish, right here, to say a few words on our great drawback to the immense and growing dairy and mercantile interest of the country. There was a time when our goods were sought after by foreign countries and consumers, and it then looked as if a bright and brilliant future awaited the butter interest of this new country, as I may say, until suddenly the manufacture of ruinous, bogus compounds, styled butterine, lardine, oleomargarine, etc., which were at once exported in large quantities to foreign countries, and palmed off as the genuine article on consumers seeking our goods.

Of course, the disreputable stuff soon showed the swindle on the face of it, which induced foreigners to believe all our products, or the greater proportion of what we exported, was nothing but a swindle and a cheat. Even the best of our productions (which are the finest in the world), have been since, and are up to the present day, looked upon with suspicion and distrust, to such an extent that even when goods are as good as represented, it is hard to get purchasers to pay their intrinsic value. It is not an easy matter to calculate the damage the manufacture and sale of this vile compound has done to this country, and to every farmer, dairyman and commission merchant engaged in this heretofore profitable business of handling pure dairy products.

To my mind, gentlemen, as well as others, more thoughtful on this subject, it must be plain, that had those bogus compounds not been introduced, and so exported as to deceive foreign consumers and dealers, the large proportion to which our export trade of dairy products would have attained would be something wonderful, and pleasant to contemplate, way beyond the meager and insignificant foreign demand that now exists. The consequence is, there is left on our hands a large amount of dairy products, which might otherwise have been disposed of at paying prices, instead of being stowed away and held in cold storage, for a possible future buyer, until it will have attained that old flavor, so common to held stock, when many inexperienced persons may be deceived into the belief that it is otherwise than pure butter; and, finally, we may have to turn it into the baker trade, for a mere song. This, as every one concerned knows, is not only a loss to the dairymen, but to the commission merchants and dealers of the entire country.

What we want, now, is a return to where we left off. Let the country return to the production and handling of nothing but genuine goods. This country is large enough to produce any amount of fine pure butter, enough to supply the world, if needed; and as the demand increases, so will the product.

In conclusion, I would say that our market has, right along, been well supplied, we having no difficulty in securing all the pure product necessary to carry us through, and obtaining good prices for the same. New houses are continually springing into existence, all in a prosperous condition.

In addition, Mr. Tivy said that he had a herd of Jersey cows, from four or five of which he got all the butter there was in the milk in the first churning; from four or five the yield was as much in the second churning as it was in the first, and the third was only slightly inferior. A few of the cows' milk produced an ounce or two at the fourth churning. The butter globules in the milk of the first cows were of uniform size, and all were churned out at the first churning; where the globules were of smaller size, subsequent churnings were necessary.

At the conclusion of Mr. Tivy's remarks, the committee on nomination for officers, consisting of Hon. John H. Morse, of Missouri; J. A. Vance, of Illinois; James Hirst, Kansas; G. Addy, New York, and J. N. Poe, of Ohio, having been appointed, reported that, inasmuch as the officers at the last meeting had done their duties faithfully, and performed the work devolving on them with fidelity and success, they be re-elected by acclamation. This was done.

The following resolutions were then adopted:

Resolved, That the thanks of this Association are hereby most heartily expressed to those persons who have prepared papers and delivered addresses before this body.

Resolved, That the Board of Public Schools of the City of St. Louis are entitled to our thanks for giving us the use of their hall for our meetings.

Resolved, That the press of St. Louis are entitled to our thanks for making so good a report of our proceedings.

Resolved, That great credit is due to Colman's Rural World, for calling into existence this organization, and for so earnestly championing the dairy interests of this portion of the West, and that we earnestly request every member to become a subscriber of that paper.

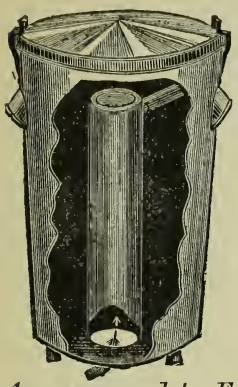
Resolved, That the officers of the Mississippi Valley Dairy and Creamery Association, and especially its Secretary, upon whom most of the labor has devolved, have discharged their duties courteously and efficiently, and to the entire satisfaction of the members of this Association.

Resolved, That the various railroad lines, centering in St. Louis, by granting return tickets at reduced rates, show their appreciation of the importance of the dairy interest, and our thanks are tendered to them for the kindness extended.

After which, the Association adjourned, *sine die*, to meet again in St. Louis next January.

CREAMERY.

The question of Creamery Butter is no longer an experiment, either in its quality as compared with all other butter made from cream, (to say nothing of the spurious substitutes, such as Oleomargarine, Butterine, Suine, etc.) But in point of financial profit, both to the producer and consumer, the thousands of creameries that are to-day in operation attest the truth of the above statements. The creamery system of handling cream, and manufacturing it into butter, has become one of the principal manufacturing industries of the entire country, from New England to the Territories. There is, perhaps, no dairy section of any considerable importance, but that is awake to this important branch of our agricultural industries; and about the only question with the people is, what is our surest plan of securing the best results from this system? In many sections it has been started on a small scale by single individuals, and hence, some single localities in Iowa have from thirty to fifty of these creameries, but this plan involves a large expense for skilled labor, as it requires an expert to handle the cream in a proper manner, as the quality, and not the quantity, determines its market value; and besides this, each butter maker must, of necessity, be an engineer, so as to take care of his own machinery, thus saving to the institution the expense of one skilled mechanic. Our system of handling this business obviates, largely, this difficulty, and saves much to each section, by centering the raw material at one point, and doing under one management the work often divided into a score or more, involving a much greater expense, and necessarily cutting down the income, both to the producer and the manufacturer. Therefore, after twenty-five years' experience in the dairy business, and ten years' experience in the creamery plan of making butter, and in three years' experience in the working of our system, known as the Southwestern Creamery Association, with nearly four hundred creameries organized, and many of them built by us, and the universal satisfaction our system gives to the communities where we have built, we present our system of buildings and outfit as the only complete and perfect system before the public, and all we ask is an inspection of our buildings and machinery, and an investigation of the working of our system, and we are satisfied you will adopt our plans. We have adopted the stock company plan as the best means of reaching the best results. The outfit we furnish has grown out of several years' experience in the practical working, handling cream and making butter, and at a great expense in time and money, we have gathered together a system of buildings and machinery just adapted to the wants of the business, and by building, as we are, extensively, we are enabled to furnish the outfit for less money than any community could for a single building.



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It has been ascertained that the shaking up of milk in carrying it to the factory injures it for cream raising; and besides, the cost of transporting the milk is many times that of the cream. This is the most feasible plan of reaching large butter districts, rendering the grade uniform, and thus abolishing the qualities of butter called "poor" and "grease."

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The cans used for hauling cream keep it from shaking or churning, and may be of any size, from ten gallons upward. During the summer months these cans are wrapped in woolen blankets, and by the application of cold water to the blankets the cream will be kept cool and in condition.

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Cream may be hauled a distance of twenty-four miles by wagon without sustaining any injury, and by rail a much greater distance. So it is possible for a factory to take cream from a greater number of cows than by any other system.

Cheese factories may make butter by adding to the factory a churn and butter worker; the cans and cream being used same as for regulary creamery.

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Chlor. of Sodium (salt),	99 4495
Insoluble matter,	0627
Calcium Sulphate	3562
" Chloride,	1316
Magnesium Chloride,	Trace
" Sulphate,	.....
	100 0000

The above Analysis clearly shows that the Salt Manufactured by the MICHIGAN DAIRY SALT CO. is the PUREST in the world, and BEST for DAIRY and TABLE USE.

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